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Journal of Electricity

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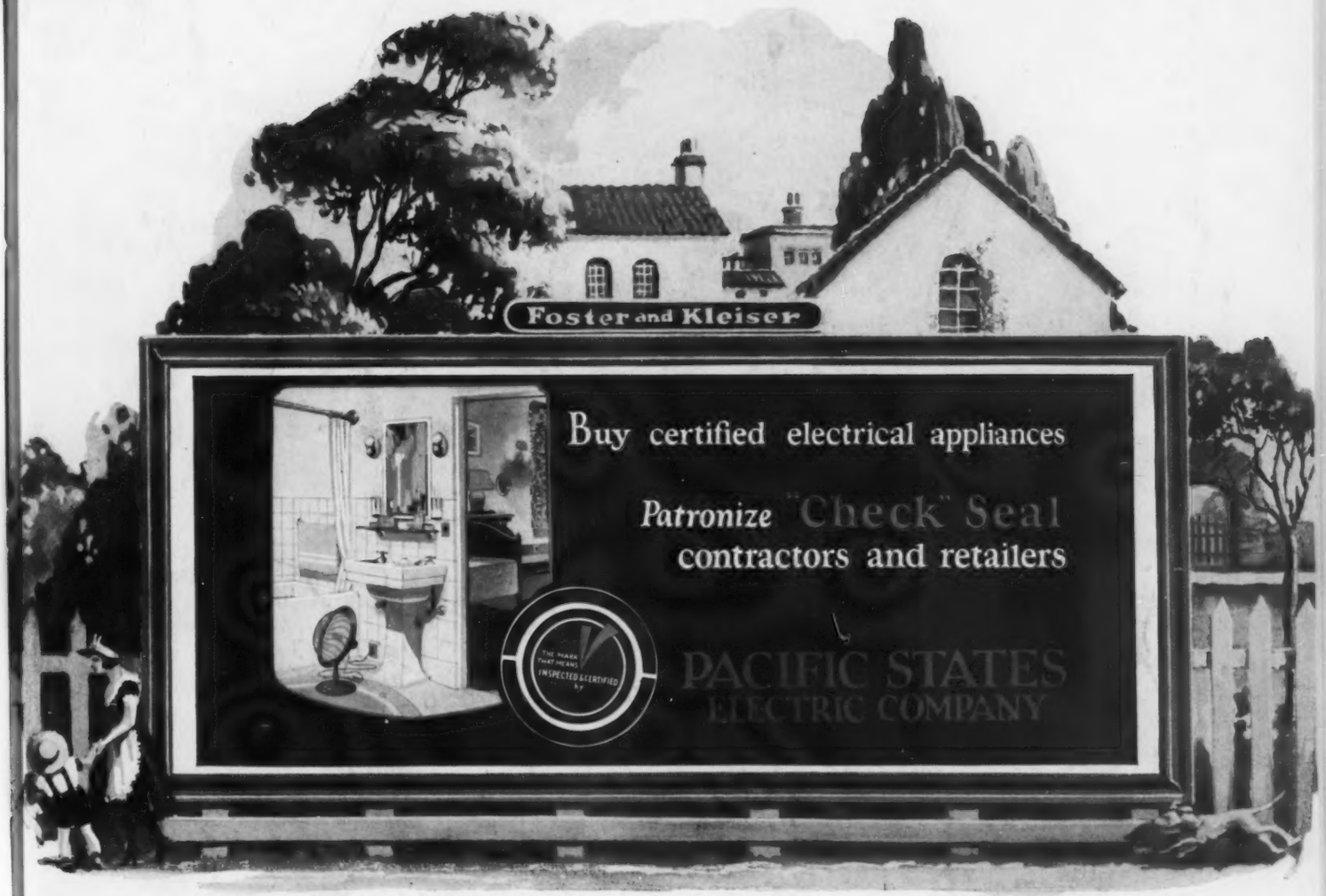

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Mgr.

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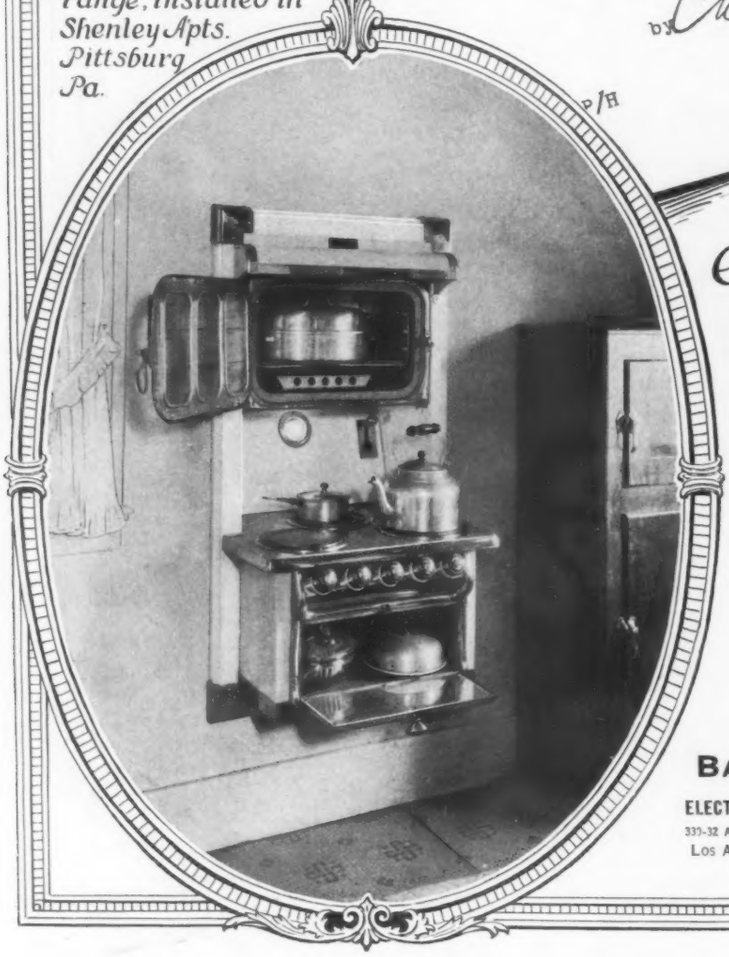

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The Power of Publicity

PUBLICITY plays an important role in our present day civilization. Through the printed word ideas are disseminated that add grist to the wheels of progress. Were a man to depend entirely upon the spoken word for broadcasting his ideas the world would be today little farther advanced than it was four centuries ago.

Few men in the electrical industry realize the power for good in the journals which cater to their special problems. It must remain for the editors to call attention to examples of what the printed word will accomplish. For example, the following letter illustrates how an idea, once in type, ignores international boundaries and invades foreign countries.

Uji-Gawa Denki Kabushiki Kaisha
The Uji River Electric Power Company, Ltd.
Osaka, Japan.

Jan. 31, 1924.

The Pacific Gas and Electric Company,
San Francisco, California.
Gentlemen:

We have to take the liberty dropping a few line and would say that we are so interested to read in the Journal of Electricity "Why Central Stations Should Investigate the Electric Truck" by Mr. Edward J. Power, director Electric Truck Bureau of your company and we are very earnestly to have all information regarding to cost data performance, figures, operating expenses, etc. for electric vehicle battery charging; and also electric equipment, its name and manufacturer, and its quotation which chargeable at some time for batteries of twenty electric trucks or more without any obligation to us. We believe that all information given by you is not only put knowledge into our idea but also profitable to our truck business throughout Japan.

Awaiting your reply to our desire at earliest convenience, we are

Very truly yours,
THE UJI-GAWA ELECTRIC COMPANY,
By Tomowo Yabey.

Among other things, the letter illustrates the desire of the Japanese to keep in step with the progress which is being made in the electrical industry in the United States. The hydroelectric resources of the country are extensive and the best practice is followed. It is not surprising therefore that the Japanese central stations should be interested in such a development as the electric truck.

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Published the 1st and 15th of each month, at 883 Mission Street, San Francisco, California.

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Contractors have said it; jobbers have said it; we have said it; and now other manufacturers admit it by making this type.

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Again Politics Loses

ON Tuesday, May 6, the proposed bond issue of $21,000,000 for sundry and various purposes of the Los Angeles Bureau of Power and Light was defeated, lacking some 2,400 votes of the necessary two-thirds majority to carry. The last figures available at time of present writing gave 104,224 votes for, and 55,757 against. There were a number of other bond issues on the same ballot. All of these, amounting to $47,900,000 carried, the power-bond issue being the only one defeated.

IT is difficult to analyze this result, and give with any positive assurance a definite conclusion. It must be remembered that the city officials in charge of the Los Angeles Bureau of Power and Light have been working strenuously to involve the city deeper and deeper in their municipal power venture. In June, 1923, the Bureau came before the voters with a request for $35,000,000. This proposal was rejected by a vote of some 41,264 for and 38,319 against, a two-thirds vote being required to carry.

IT is interesting to note that in the former case, a bare majority was secured for the bond issue, while in the latter, a mere handful of votes would have reversed the result. Again, note that in the former case less than 80,000 votes were cast, while in the latter practically twice that number evinced their interest in the point at issue.

PRO-PUBLIC ownership Los Angeles papers comment on this result as a virtual victory for government ownership. We must confess our inability to arrive at this viewpoint. On the contrary, the question at issue was not whether the people were for or against their power enterprise. They are already committed to it. The question was whether or not the taxpayers were willing to give to their officials another $21,000,000 to play with. In spite of a vigorous campaign waged for the bonds, the voters said "No," rather half-heartedly, but "No," nevertheless.

THE good people of Los Angeles seem to be in the unfortunate position of the banker, who, having loaned large sums of money to a client, must perforce loan him further sums in order to recover something out of his venture. It seems equally logical that if the voters would not stand for so great a sum as $35,000,000 which they refused to grant in June, 1923, and if they interposed not quite so vigorous a "No" at the more modest request for $21,000,000 a few days ago, they might give the Los Angeles Bureau of Power and Light some such paltry sum as ten or fifteen millions if they asked for it.

THE frantic appeals for more and more money would indicate that there was need for it, and we believe that there will be no cessation of this clamor until the taxpayers will be faced either with a failure of their power venture and therefore be compelled, willy nilly, to dig down in their trousers pockets and pay the bill, or perhaps a reversal of feeling will bring about a sentiment for the return of the enterprise to private ownership. In the meantime the city fathers of San Francisco, in debating the Hetch Hetchy power project, might learn much from their neighbor on the south.

Let Us Scotch the Rumor-Monger

THERE is something appealing about the man who stands up on his two feet and speaks his mind in public that all may hear. We may or we may not agree with him. Whether we do or not, we cannot do other than respect him for having the courage of his convictions and the manhood to proclaim them. The whisperer, the soft-spoken purveyor of back-door gossip, the "Don't repeat this as having come from me" male biped, all of these seem to be an unavoidable part of our social and business fabric. You know the type. Did you ever hear one of them say anything good about anybody or anything?

There is no known cure for the gossip himself. There is a preventive, however, and that is an unsympathetic hearer. The purveyor of rumors to the effect that So-ond-so is in financial difficulties, that Such-and-such jobber is subsidized by the power company, that This-or-that manufacturer secretly controls a certain retail establishment, cannot peddle his poisonous wares to those who will not listen.

There is a little Japanese statuette that might well adorn the desks of all of us. There are three monkeys, who "Speak no evil, see no evil, and hear no evil." This idea is anything but new, but it must be repeated at intervals lest it be forgotten. There is much good that may be spoken. Why not concentrate on that, and turn a deaf ear upon the rumor-monger, who, if we are so foolish as to let him, may poison our minds against our best friends, and do incalculable damage. Let us give the benefit of the doubt invariably. We may need it ourselves.

A Possible Menace to the Success of Future Conventions

DURING June there will occur two of the most important conventions of Pacific Coast electrical interests during 1924. We refer to the meeting of the Pacific Coast Electrical Association at Coronado, Calif., and the sessions of the Northwest Electric Light and Power Association at Gearhart, Ore. Undoubtedly both gatherings will be characterized as "the most noteworthy in the history of the organizations."

It is the earnest desire of the officers of both associations to have these 1924 conventions go down in history as meetings of accomplishment. Undoubtedly such will be the case, for committees have worked ceaselessly during the past twelve months to prepare papers and reports which would prove worth while. It remains for those who attend the sessions to participate in the discussions and to derive therefrom ideas which they can apply to their own problems.

Right here, it might be well to point out a dangerous tendency that has been developing around such annual gatherings during the past few years. There has been too much thought of pleasure and not enough of business. Delegates have devoted time that should have been put in at section meetings to golf, dancing and conviviality. The feeling is becoming prevalent among all associations, and particularly among the electrical industry, that unless there are produced more direct results for the time, money and effort spent on conventions, executives will have to limit sharply the attendance of employees. In fact, they may be forced ultimately to do away with conventions altogether.

As matters stand at present, the committees in charge of the convention programs try to make a rational division of time between work and pleasure. Plenty of play is provided at the right time. It remains for those attending to see to it that they themselves devote time and attention to the business features. Conventions are useful. They provide opportunity for necessary interchange of thoughts and ideas. The electrical industry must not allow future conventions to be jeopardized by failing to realize the importance of the meetings in which delegates are supposed to participate.

Why Discriminate Against One of the Youngest Electrical Industries?

INCLUDED among the provisions of the Finance Bill now before Congress is a proposal to levy a tax of ten per cent on the manufacturer's price of radio equipment. The object of this proposal, as is the case with all tax provisions, is to raise money for the support of the government. However, it is difficult to understand by what process of reasoning it was decided to select radio apparatus to bear this burden. Possibly this line is suffering on account of its position in the lime-light of public interest.

Primarily, this tax seems unjust. How, for example, is one to tell what is and what is not radio apparatus? A piece of wood, a bakelite panel, an insulator or a piece of wire constitute no part of radio until used in combination for that purpose. How, or when, then, is one to decide that any of these items is taxable? Endless confusion and dispute seem bound to ensue. Expensive collection and possible litigation loom conspicuously if this feature of the tax bill be enacted.

It would appear that entirely apart from the fact that an unfair burden will be placed on one of our newest industries, the revenue could better be raised by means of a retail sales tax or by including in the taxable items other lines of industry that are already firmly established and which, for that reason, would find the proposed levy less burdensome.

Hard Work Is Cure for Hard Times

THE "I told you so" gentry common to every class of business are raising a hue and cry regarding an impending business depression in certain Western states as a result of lack of rainfall, the epidemic of hoof and mouth disease in California and the fact that this is a presidential year. On the face of things, there is no cause for fear or hysteria. An excellent analysis of the situation is contained in the current issue of Pacific Business (San Francisco). This publication says:

"For the Pacific Slope: 'As a man thinketh in his heart so is he,' is applicable to the business man

of the Far West. He is optimistic and he is looking to the future with confidence. It follows, then, that despite unfavorable influences such as lagging lumber sales, the live stock epidemic, danger of drouth and disquieting political influences, business in this district continues remarkably good. Retail sales throughout the region are with few exceptions greater for March than for February even though somewhat less than a year ago, due in a measure, no doubt, to the lateness of Easter. Notwithstanding the handicap of dry weather Los Angeles sales were greater than March last year.

"The sanity with which business is being carried on indicates the strength of the immediate future. It is our belief from a survey of all factors that Pacific region business will be fair to good at least on through to summer, with a fresh spurt of activity later in the year. It is a good plan, however, to stay 'close to shore' as previously advised. Prices show little likelihood of strengthening unless there should come an unexpected foreign demand for goods."

"As a man thinketh in his heart so is he," aptly applies to the present situation. If you are inclined to be lazy, there is no better alibi than "depression" to explain lack of business. Depression is largely a state of mind. There is no better cure for hard times than hard work. If things look dull, take off your coat, roll up your sleeves and go after business.

Care Must Be Exercised in Comparison of Electrical Equipment

SUGGESTIONS have been made by the electrical press from time to time that the industry cooperate with the home economy departments of some of the leading universities in making studies of the principal electrical household appliances. It was believed that tests could be made by unbiased agencies such as these which would prove the contentions of the industry regarding the advantages of electrical labor-saving equipment for the housewife. Such tests might then be quoted in sales promotion work.

A recent case of such a test has come to our attention in which an electric range was compared with other forms of cooking equipment to determine efficiency, cost of operation and other important factors. Due to unfamiliarity with the equipment several serious mistakes were made which resulted in an unfavorable comparison for the electric range. For instance, the range oven was allowed to operate at full heat throughout the test resulting in overheating. The oven door was opened at regular intervals to read thermometer temperatures while such readings were made through a glass aperture in the gas oven. Costs were computed on the basis of 9 cents per kw-hr. for electric energy, the lighting rate, instead of the cooking rate. Other serious mistakes were made, all of which contributed to the unfavorable impression regarding electric cookery.

This occurrence should prove a lesson to the industry. Luckily the results were not widely circulated but a wrong and probably lasting impression was formed in the minds of the many students in the class in which the test was made. If such comparisons are to be made in the future and if they are to have the effect desired, it will be well for the industry to see that they are properly supervised and that someone thoroughly familiar with the equipment to be tested is in charge.

Consider the Goldfish

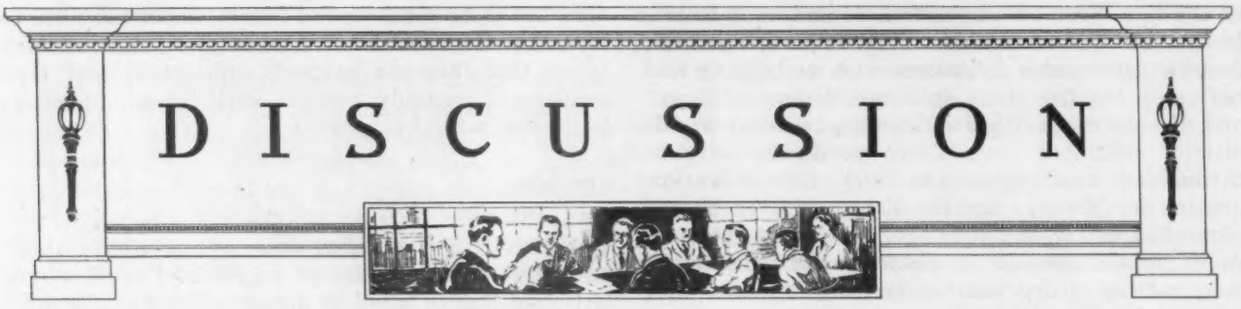
SPEAKING of privacy, there is something about the domestic menage of a goldfish that is singularly like that of a public utility. The domicile ordinarily occupied by a goldfish in captivity is a glass globe. It has no doors, no roof and no windows. Indeed the last would be a superfluity, for the goldfish globe of commerce is quite transparent. There is not even the saving grace of a shade of any sort. In short, the goldfish is a living breathing apotheosis of pitiless publicity. His daily peregrinations about his limited bailiwick are subject to scrutiny of the most intimate sort at any hour of the day or night, whenever the spectator, diverted for the moment by this glittering specimen of the finny tribe, should choose to dawdle about, manifesting an idle interest in its doings.

In this respect at least, the public utility is the goldfish of the industrial world. It is regulated by commissions, quite legally of course, that pry into its innermost affairs in a thoroughly ruthless way, and then, with glee and gusto spread the news abroad in the land for the edification of the proletarian readers of five-cent newspapers. In fact, through the development of the private-ownership commission-regulation idea, public utilities have practically ceased to function as private property; they have become metamorphosed by the evolution of events into public trusts, into the operation of which any citizen can pry to his heart's content by merely referring to the files and records of the regulatory commission.

It has been suggested, facetiously, that people who live in glass houses should pull down the blinds. The goldfish and the public utility, however, are not equipped with these modern conveniences. Both must, therefore, live their lives with the utmost circumspection, subject to the glare of the incandescents at all sorts of unsuspected moments. We would rather not be a goldfish.

Northwest Electric Range Survey Deserves Support of Entire Industry

ALL branches of the electrical industry should be interested in the electric range survey which the range committee of the National Electric Light Association is sponsoring in Spokane, Wash. The committee is performing for the industry a service for which there has been a long-felt want. On another page of this issue its plans are outlined and some of the results which it hopes to achieve are set down. The work of the committee should receive the hearty support of every man in the industry and efforts should be put forth to see that the funds required for conducting the survey are placed at the immediate disposal of the men in charge.



Takes Exception to Statements Regarding Los Angeles Municipal System

To the Editor:

Sir: Enclosed herewith is a criticism of Frank G. Tyrrell's address before the San Francisco Electrical Development League and which was published in the last issue of the Journal of Electricity. The enclosed data will indicate the utter unreliability of Mr. Tyrrell's statements.

Figures are being used with the intention of conveying the impression that the municipal Bureau of Power and Light is woefully mismanaged. Mr. Frank G. Tyrrell, of Los Angeles, quotes to San Francisco audiences the Los Angeles Times, an avowed bitter enemy of the Los Angeles Bureau of Power and Light, as authority, which statements are repeated on every occasion by proponents of the great power corporation trust.

The organ of the Pacific Gas and Electric Company called "P. G. and E. Progress" prints the same figures and adds some of their own stating that "official figures are given as authority."

As in the majority of statements coming from such sources totally unrelated facts are grouped for comparison, but without disclosing the basis of figuring.

For the sake of clarity let us remember that prior to May 15, 1922, the Edison company retained possession and management of its electric distribution lines, which were afterwards purchased by Los Angeles, operating the system as agent for the city. It deducted all operating and certain other expenses, turning over the net balance to the City of Los Angeles. On May 15, 1922, the City of Los Angeles obtained physical possession of and operated the lines of the Edison company as well as the municipally-built system.

Figures usually quoted and referred to above, purport to show that after the city took over the Edison lines the number of employees increased in vastly greater proportion than the consolidated business justified and greater than when the Edison system was operated separately under the management of its officials.

The figures quoted are so far from any likelihood of truth that it is impossible to trace the origin or official authority. For instance, it is said that

"While the number of electric consumers on the lines of the Municipal Bureau of Power and Light has increased 45 per cent as a result of the city's purchase of the Los Angeles business of the Southern California Edison Company, the number of employees on the bureau's payroll has increased 275 per cent."

This quotation is as of December, 1923. The percentage increases are not and cannot have been figured on the same basis, because there are no facts to remotely suggest the percentages.

The facts are:

By December, 1923, compared with May, 1922, the number of meters on the combined system had increased 850 per cent over the original municipal system.

The distribution employees were increased 300 per cent to take care of this 850 per cent increase in meters or consumers.

The same unreliable authority states that the number of city distribution employees was (in December, 1923) 1,800.

The fact is that the average number of distribution employees on the payroll was 938 and these men were employed also in very extensive construction work entirely outside of and separate from operating and maintaining the system.

The surest and fairest gage of the efficiency of the Los Angeles Power Bureau may be found in the comparison of increased expenses with increased business.

Combining the number of meters, the gross revenue and maintenance and operation expense of the Edison System and the City System for the year 1921-1922 while operated as separate organizations, and comparing these data with the fiscal year 1922-1923 wherein there is a full year of operation of the consolidated systems under the management of the City of Los Angeles solely, we find by comparison—

Meters increased	17.1 per cent
Gross revenues increased	12.8 per cent
Maintenance and operation expenses, exclusive of taxes and purchased energy increased	11.3 per cent

but, upon taking over the Edison lines the city reduced rates amounting to $600,000 for the year. Allowing for this we find the gross revenue increase to have been 21.5 per cent against the corresponding operation and maintenance expense of 11.3 per cent.

The above statement of facts from the official books ought to be sufficient to refute statements of this character, told and reiterated by the power corporations in official publications such as the "P. G. and E. Progress." The official audit of the books gives the plain truth.

There is one completely satisfying answer which will permit anyone, judicially minded, who desires the truth to form an intelligent judgment from an independent source of reliable information.

All persons, including power corporation officials, will agree that the rigid criterion of efficiency in the management and operation of large works is the financial yardstick.

The report of Price, Waterhouse & Company, an auditing firm of international reputation and standing, who audit the books of the Bureau of Power and Light, Department of Public Service, City of Los Angeles, shows that the revenues collected by the Municipal Power Bureau were $7,763,000, and that this service was rendered at a cost of $5,069,000, leaving a surplus or profit for the year of $2,694,000.

These figures of Price, Waterhouse & Company, certified public accountants, are based upon a system of accounting paralleling that required by the State Railroad Commission of private electric utility corporations. The figures, therefore, may be used for comparison, notwithstanding the exceedingly low rates collected from consumers by the Los Angeles Bureau of Power and Light.

The audit shows that rates were above cost, the surplus being 35 per cent of the revenues; or, put another way, the surplus or profit was equal to 53 per cent of the cost of the service.

The combined effect of the very low rates charged by the Municipal Electric Power Bureau of Los Angeles and the highly economical operations of that bureau, has resulted in the cost of the service ($5,069,000) being $3,700,000 less than it would have cost consumers had the Pacific Gas and Electric Company delivered this same service to consumers, at that corporation's rate charged in San Francisco and Bay regions, and over $4,800,000 less than the Southern California Edison consumers would have paid for the same service at rates charged in Long Beach, or other points outside of Los Angeles.

The balance sheet of this audit of Price, Waterhouse & Company furnishes another basis of comparison. The balance sheet as of June 30, 1923, shows assets of $35,000,000 with

liabilities practically $25,000,000, and, therefore, leaving an equity of closely $10,000,000. The report further discloses that of this equity, $6,423,000 was derived from surplus or profits of the Power Bureau earned during its six years of operation.

The outstanding bonded indebtedness is a little over $21,000,000, which very agreeably compares with assets. At the same time the regular yearly reduction in bonded debt suggests further increases in surpluses, or the opportunity for still lower rates for the future.

Some groups of citizens prefer to think in terms of "earnings on investments." The Municipal Corporation is not concerned with this question, as service is presumed to be rendered at cost.

If the rates charged are to, or do, yield a surplus or profit it is a matter of policy not affecting the cost of the service. Such surpluses, moreover, are put back into new property belonging to the people.

From the balance sheet of the report of Price, Waterhouse & Company, it may be assumed that the investment in operating and other physical property of the Bureau of Power and Light in the City of Los Angeles did not exceed $33,000,000 for the year. From this it will be seen that the net profit or surplus of $2,694,000 indicates **net return after all interest has been paid on outstanding bonds of 8 per cent.** Corporations, however, in figuring the rate of return do not deduct the interest on bonds. In this event the net return is around 11 per cent on the investment. On the other hand, deducting from surplus an amount equivalent to taxes required of a corporation the rate of return would still be equivalent to over 9 per cent on the $33,000,000 investment.

This rate of return is comparable with the electric utility figures as allowed by the Railroad Commission as one element in rate making.

Still another view of the financial situation may be deemed interesting.

It will be noted that the surplus of $2,694,000 for the last fiscal year was obtained as a net after deducting the interest on the outstanding bonded debt. Hence, the surplus noted would under corporation practice, be available for the benefit of stockholders as owners of the $10,000,000 unencumbered equity, which equity costs the taxpayers only $3,553,000 as the report of Price, Waterhouse & Company shows.

Again, assuming that the City of Los Angeles paid taxes as a private corporation does, such items would be deducted from surplus, leaving the balance as the earning for the benefit of the equity in the property, and yielding a 20 per cent return to stockholders.

These results were obtained from rates to consumers lower than anywhere else in California where served by private utility corporations.

How can this claim of the propagandists of the private power companies be justified when it is shown that by the audit for the fiscal year ending June 30, 1922, a period when the Edison company operated its lines and the City of Los Angeles operated its own municipal lines, each by separate organization employees, as compared with the following year when the city operated the consolidated lines and business itself that the surplus allowing for a reduction of $600,000 in rates was $1,350,000 greater than the year before. This showing was in spite of the extraordinary extra expense incident to co-ordinating, consolidating and absorbing two separate systems throughout a great city. This extra expense fully offset the increase in revenues.

The officials of private power corporations may argue that the municipal Power Bureau of the City of Los Angeles is inefficient and mismanaged because they say, among other things, there is a larger number of employees per consumer than the system used to require when under private management; but, even if such charges were true (which they are not), the fact cannot be escaped that no private corporation in California, large or small, approximates the handsome financial showing of the Bureau of Power and Light as disclosed and proved by the audit of Price, Waterhouse & Company.

It is gratifying as well as a comforting thing to the people of Los Angeles that the figures given above by Price, Waterhouse & Company and by the Bureau of Power and Light are facts, undisputed and incontrovertible.

FRANKLIN HICHBORN,
State Campaign Committee,
California Water and Power Act.

San Francisco, Calif.
May 4, 1924.

EDITOR'S NOTE:—

Regarding the above statements we have the same old problem. Politically owned utilities conduct their affairs secretly. They then make carefully edited statements regarding them which, while known to be misleading, can only be answered by a general denial.

The Price-Waterhouse audit is presented as if this audit tells the public what a private investor would be entitled to know about the financial conditions of his company. Nevertheless, statements and rumors concerning unpaid (and unpayable) Power Bureau obligations, running into millions, have been current in Los Angeles for months. Even city councilmen have found it impossible to learn what this amount really is.

It is an astounding fact that this Price-Waterhouse "audit" does not answer the simple question, "What do you owe?"

The statements about the number of employees on the city distributing system purchased from the Edison company, before and after acquisition by the city, do not agree with the best information that outsiders are able to get. The letter speaks of an "increase" of 850 per cent in city meters. This, of course, was mainly the result of the purchase of the Edison city business. The real point is—did the number of employees on that system increase under municipal operation from one employee to 244 consumers, to one employee for 95 consumers? Our information is that this was the case.

Rates

Statements are made regarding low city rates in Los Angeles. The last Edison domestic rate in Los Angeles was 5½ cents per kilowatt-hour. Under the operating agreement the city increased this to 6.2 cents, **and took the increase.** On taking title, the city reduced the rate nearly (but not quite) to the former Edison rate. If Edison company had kept the system and the Railroad Commission had made the same proportional reduction in the city as elsewhere on the Edison system, the city domestic rate would now be 5.1 cents against the 5.6 cents now charged on the city tax-free system. Taking off from this rate merely the state and federal taxes (10 per cent) would make this comparison 4.6 to 5.6. That is only the lesser part of the tax burden. The general manager of Edison company is on record as saying that if free of income tax on stock and bond interest, as well as from property and business taxes on the system, all rates could be cut 25 per cent without its costing stockholders a penny. This makes the reasonable comparison 3.83 cents for a tax-free company service in Los Angeles against 5.6 cents for the tax-free city service now being supplied. If the city's "saving" of taxes made any reduction in the cost of government, it might amount to something; but as it is, the public merely pays the same sum out of another pocket.

The Journal of Electricity has already published census figures of cost of government per capita in the United States. The highest cost of all was Detroit, next Seattle, and next Los Angeles—the three political ownership cities "par excellence."

The letter claims Bureau of Power and Light assets of $35,000,000, "with liabilities practically $25,000,000." It does not mention that the taxpayers have contributed nearly $6,500,000 of this total, and that much of this contribution was made years ago. During all of the time since then Los

Angeles has been borrowing money, and, to get the taxpayers' actual contribution, interest on those tax payments of at least 4½ per cent would have to be added. In addition to that, all that the Bureau has been able to save in excess of gross receipts over operating expenses also went into construction.

The fact that Los Angeles Bureau of Power and Light is furnished with free water for its plants has often been commented upon. It has not been pointed out very strongly that of the actual cost of construction of the Los Angeles Aqueduct, purely as a means of transporting water, millions of dollars in excess of the actual necessary cost of a water conduit were expended in keeping the canal on a flat grade, so as to concentrate the fall of the water at points where power plants could be located close to the city. These extra millions, at least, which were spent for power and for nothing else, ought to be included in the power bill.

Taxes

A careful analysis of the matter of taxes which a private company would pay were it operating the Los Angeles system, reveals some interesting figures.

State, County and Municipal Taxes

No state, county or municipal taxes are paid on the municipal power system, and none are included in operating expenses. The amount of such taxes attributable to the year under review on the basis of taxes paid by private companies, which amount to 7½ per cent of gross receipts from operation for the preceding year, are as follows:

Gross receipts for year ending June 30, 1922	$6,880,940.74
Taxes attributable to 1923—7½%	516,070.55

Federal Taxes

The municipal power system is also exempt from payment of federal taxes. A private company would have paid during the year under review income tax and capital stock tax as follows:

Net income of Bureau of Power and Light for year ending June 30, 1923, as per Price, Waterhouse & Company's report—Exhibit II		$2,693,623.34
Deduct: State taxes which would have been paid by a private company as shown above		516,070.55
Balance Taxable Income		$2,177,552.79
Income Tax	—12½%	
Capital stock tax, estimated—	1½%	
Total	14%	$304,857.39

Use of Aqueduct

No charge is made against the electric department for the use of water supplied from the aqueduct. The entire cost of construction of the aqueduct, as well as all charges for operation and maintenance, is charged against the water department. The electric department should be charged with an amount at least equivalent to the carrying charges and operating and maintenance expenses of a transmission line from the source of supply to the site of the power house. This is estimated as follows:

Investment		
Estimated cost of substations and switching stations		$1,250,000
Estimated cost of double transmission line		4,000,000
Total		$5,250,000
Carrying Charges		
Interest at 5%		$262.500
Sinking Fund at 2½%		131,250
Total Carrying Charges,		$393,750
Operating Expenses, Maintenance and Depreciation		
Operating Expenses estimated at 0.03c. per kw-hr. transmitted		$78,195
Depreciation on Sinking Fund Basis		43,470
Total		$121,665
Total amount chargeable to Electric Department for use of Aqueduct		$515,415

The Bureau of Power and Light claims interest and sinking funds on power bonds is paid from earnings. Yet, in the much advertised statement of profits for the year ending June 30, 1923, interest is included for sinking funds on power bonds issued, as follows:

On $ 3,500,000 1910 issue	$100,000
On $ 6,500,000 1914 issue	250,000
On $13,500,000 1919 issue	337,500
Total	$687,500

The Bureau of Power and Light claims to be charging low rates, yet an increase of 12½ per cent in the rates ordered by the City Council at the request of the Public Service Commission in October, 1920, is still in effect while rates of private companies have all been reduced by the Railroad Commission and all war increases eliminated. This 12½ per cent increase in rates was part of the total income collected by the Bureau of Power and Light for the year ending June 30, 1923, and was an overcharge to city consumers of $862,511.88.

The Bureau of Power and Light purchases power at wholesale from Southern California Edison Company under a contract approved by the State Railroad Commission. Under the rates fixed by the Railroad Commission the city purchased this power during the year 1923 at a reduction of 29 per cent below the rate agreed to between the city and the company in the original contract. No part of this rate reduction has been allowed retail consumers of the Bureau of Power and Light even though the city's payment for purchased power was reduced $593,691.90.

The rate charged the Bureau of Power and Light this year is still less. The Railroad Commission recently ordered a further reduction in this rate of 7½ per cent, saving the Bureau of Power and Light an additional $109,306.23.

The total amount which should immediately have been allowed retail consumers on account of reductions made by the Railroad Commission in the wholesale rate is $702,998.13.

To pay interest and sinking funds on power bonds previously issued the people have been taxed $6,392,535.89. Instead of fulfilling their promises and paying this amount from earnings, the Bureau of Power and Light diverted the funds to pay for extensions to serve new customers from whom they are collecting their regular charges. The taxpayers are entitled to have all of this money returned to them and in the meantime the Bureau of Power and Light should be paying them interest at the rate of 6 per cent each year, or $383,552.15.

The Bureau of Power and Light has now outstanding $21,300,000 of power bonds which are exempt from all taxes and the federal government must collect an equivalent sum from farmers and the people at large to support the government. If these were private corporation bonds, the government would collect each year $213,000.

Prior to the time the Power Bureau began operating its own plants electric service was furnished in Los Angeles by the power companies and

the maximum rate was 5½c. for each kilowatt-hour. This rate included taxes collected by the companies from consumers and paid to the state and federal governments, leaving the net rate obtained by the companies 5c.

The Power Bureau started in by furnishing a few scattered consumers at this 5c. rate because it was not obliged to pay any taxes. Later the municipal rates were increased 12½ per cent, making the lighting rate 5.6c., which is still in effect.

The Bureau of Power and Light includes no item in its reported expenses for the cost of bringing water through the aqueduct over two hundred miles from Owens River to the city power plants and using this water for the generation of power. All of the cost of the aqueduct is charged to the water department in spite of the fact that many millions of dollars extra were spent on the aqueduct that the water might be delivered to the power plant locations for the purpose of generating power. Because the city water department is unable to collect anything for this valuable service it has been compelled year after year to collect directly from the taxpayers a substantial part of the amount it must pay for interest and sinking fund on water bonds. During the year ended June 30, 1923, this amounted to $1,098,450, which is just about one-half of the interest and sinking fund charges on water bonds.

The Bureau of Power and Light should pay its proper proportion of the annual amount of maintaining the aqueduct because all of the water is used in the power plants and without this water the power plants would be merely junk. If the power plants were located at the head works of the aqueduct instead of near the terminus, the Power Bureau would have to build a 240-mile steel tower transmission line to bring the power to Los Angeles. The aqueduct saves this expenditure and the Power Bureau should compensate the water department and relieve the taxpayers accordingly.

When the Bureau of Power and Light took over the Southern California Edison Company distributing system in the city the company was required to turn over to them the balance in the depreciation fund of $749,367.94, accumulated during the period the company system was operated for the benefit of the city under the much discussed Operating Agreement. The Bureau of Power and Light did not credit this to depreciation fund to be spent for replacements, but put the money in its general coffers and then complained that the Edison system was not up to standard. During the first year of operation the Bureau spent $551,532.95 in strengthening the Edison system but instead of charging this against the money collected from the Edison company for this purpose they charged $250,000 as an additional investment and $301,532.95 against the Bureau's meager depreciation fund supposed to be held intact to make replacements to the generating plants.

Service to Other City Departments

When the Los Angeles distributing system was operated by Southern California Edison Company, the city hall, public libraries and other public buildings were furnished energy for lighting, etc., without charge. Since the taking over of the system by the Bureau of Power and Light, these other city departments have paid regular schedule rates for this service. While no figures are available as to the amount supplied during the year under review, this has amounted to a considerable sum.

In making comparisons of government-owned and operated utilities with those under private ownership and commission regulation, the question of taxation and the revenue therefrom are inseparably interwoven. That the cost of government must be met cannot be denied. Robbing Peter to pay Paul may bring about a "paper" showing for such an enterprise as the Los Angeles municipal power and light enterprise, but such accounting methods are a mere subterfuge. It simply brings about a disproportionate burden upon other sources of tax revenue in order that those in control may attempt to justify their representations of "large profits" to the voters who authorized the incurring of the indebtedness that made the enterprise possible.

Since such enterprises are subject to neither scrutiny nor regulation by such a body as the California State Railroad Commission, it is indeed difficult to ascertain what is being done; in fact such deductions as have been evolved from the comparatively meager data available would tend to show that more things are being done **to** the taxpayers than **for** the taxpayers.

It is at least interesting to note that, in spite of the fact that all the cost of bringing the water for power purposes to the generators of the city plant is paid by the Aqueduct and no taxes of any kind find their way into the general fund for defraying the cost of government, the rate charged by the city is appreciably higher than the last rate charged by the Edison company.

The question of tax-free bonds is beginning to receive attention from Congress; in fact it has been proposed to repeal the tax-free provision because of the loss of income to the government from men of large income, whose money seeks such investments rather than development enterprises. Thus it is that the man of moderate income rather than the very rich is carrying the expense of government through the institution of such enterprises as that of the Los Angeles Bureau of Power and Light which, under the cloak of swatting the wicked power trust and preserving the water and power resources for the benefit of the people, actually, through the creation of additional tax-free securities, imposes a greater and greater burden on the remaining sources of tax revenue in order to make up the deficit created by the loss of tax income formerly paid into the public treasury by the power companies.

The government ownership and operation of all sorts of things and the promise of operation without profit for the benefit of all the people has a dulcet sound in many ears. It must not be forgotten, however, that profits mean efficiency, and that efficiency and government ownership have not yet shown any signs of going into partnership. Modern business insists upon efficiency, and it hires and fires until it is brought about. Modern politics unfortunately is based upon totally different standards, and the interjection of politics into business inevitably means slack methods, little if any discipline and inability to fix responsibility.

We welcome the expression of views contrary to our own, but we cannot see anything in Mr. Hichborn's statement that in any way strengthens the case for the Los Angeles Bureau of Power and Light, or for the cause of government ownership and operation of public utilities in general.

THE EDITORS.

CONSTRUCTION is proceeding rapidly on the Lakeside plant of the Public Service Company of Colorado at Boulder, Colo. The first 20,000-kw. turbo-generator is being installed at an estimated cost of $4,000,000. Features of the new plant are the 375-ft. smokestack and the artificial lake upon the shores of which the station stands. Pulverized coal will be used as fuel. Present plans call for the completion of the plant in August, 1924. Energy will be transmitted to Denver for utilization.

The Interdependence of Irrigation and Hydroelectric Power

By John D. Galloway

Consulting Engineer, San Francisco, Calif.

THE prevalent idea that there must always be conflict between the uses of water for irrigation and water for power is a popular fancy, fanned by demagogues and politicians who seek personal aggrandizement and popularity. From an engineering standpoint the two are closely related. Instead of conflict between these two major demands for water, there is a mutual interdependence between the two, for their interests are identical.

IN connection with several discussions of the development of hydroelectric power the writer has had occasion to refer to the intimate relation that exists between that industry and irrigation. The prevalent idea is that there is an irreconcilable conflict between power and irrigation when it comes to the use of the waters of any one stream. This belief is entirely incorrect, as there is, on the contrary, an interdependence between the two uses of water that can be used for mutual benefit, especially that of irrigation. Any stream, when properly developed, can be made to furnish a maximum of power and a maximum of water for irrigation and the works of one can be so designed that they will serve the uses of the other with a resulting minimum of cost.

The impression that the two uses of water are in conflict has arisen, in California at least, largely from the fact that in the evolution of the arts of power and irrigation, two different agencies of the state have been employed: power by private corporations and irrigation by municipal corporations. Due to the usual shortsightedness of humanity, assisted by demagogues and politicians, who fish in troubled waters for their own benefit, this idea of conflict is deep-seated. When, however, the subject is treated as an engineering problem, the apparent conflict disappears and a mutuality of interest is shown to exist.

It is recognized that each river is a problem by itself, the solution of which depends upon its physical characteristics. The various items of watershed, precipitation, seasons, storage sites, tributary land areas, etc., must be taken into account and a study made in detail before a correct conclusion can be reached. The subject is only treated in a general way herein. Illustrations are drawn from California streams because in that state there has been the greatest development, both of power and irrigation, of any in the country. The difference in the agencies employed to construct the works is of no importance except that power developed as an adjunct of irrigation works may be disposed of to private corporations.

Before showing the relationship between the two uses of the water, it is in order to set forth the limitations that govern the use of water for power and water for irrigation. Unless these are understood, no appreciation can be had of the relationship between the two. It is unnecessary to mention more than the mutual dependence upon each other, of the city and country, of the urban and suburban areas where power is most used and where the products of agriculture are mostly consumed, and of the country, where water is used and where manufactured articles from the cities are required. In a way, modern life is based upon power, and in the West hydroelectric power is of supreme importance, both in city and country. In the modern scheme of things, it is of equal importance to generate power and to raise food.

Characteristics of Power Systems

As in all other phases of industry the use of power is not uniform but varies with the day and with the season. A mathematical average of the power demand may be obtained and the relation of this average demand to the maximum or peak demand is expressed as a percentage—the daily or annual load factor. With the daily fluctuation of power demand this discussion is not concerned, except to note that by the use of steam reserve power plants at the receiving end of long transmission lines to carry some of the peak loads, the daily load factor on hydroelectric plants may be raised above the system load factor, up to 75 or 85 per cent in California.

The changes in energy demand over a calendar year is of extreme importance in the relation of power to irrigation; first in relation to the amount of water discharged from power reservoirs and second, in the ability of power systems to consume the energy from a power plant taking water from a reservoir, the primary use of which is for irrigation and the delivery of which corresponds to the irrigation demand.

The characteristics of power systems as regards the demand in the several months of the year for

energy differ widely. The accompanying table shows the annual variation in energy output by months expressed as the average daily output for each month and the percentage of the annual mean, of five large power systems in the Pacific States.

These data are for the year 1921 as representing most closely the annual variation, undisturbed by naturally desire to pour a large amount of water on their lands during the time of spring floods. Hence in May and June the demand for water is greatest. With the presence of ample water in a storage reservoir, to be used when required, it is probable that the demand will be lessened in the months of maximum demand. The recently completed Don Pedro

TABLE I—DAILY AVERAGE ENERGY OUTPUT, IN KILOWATT HOURS, AND PERCENTAGE OF ANNUAL MEAN.

Month.	Washington Water Power Company.		Puget Sound Power and Light Company.		Pacific Gas and Electric Company.		San Joaquin Light and Power Company.		Southern California Edison Company.	
	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.
January	984 430	96.0	1 196 330	104.1	3 964 000	97.2	778 960	71.8	2 297 360	78.5
February	969 590	94.5	1 177 020	102.4	3 857 000	94.5	765 100	70.5	2 052 010	70.0
March	977 190	95.3	1 182 710	103.1	3 806 000	93.4	821 800	76.8	2 464 890	84.3
April	925 190	90.3	1 137 340	99.0	3 937 000	96.5	1 213 120	112.0	3 085 780	105.3
May	879 980	85.8	1 041 040	90.8	4 290 000	105.0	1 172 890	108.1	2 865 560	98.0
June	973 700	94.9	1 064 120	92.7	4 430 000	108.5	1 258 130	116.0	3 309 960	113.0
July	1 011 440	98.7	1 007 350	87.7	4 284 000	104.9	1 369 600	126.0	3 575 340	122.0
August	1 112 690	108.6	1 078 000	93.9	4 277 000	104.8	1 360 160	125.2	3 548 890	121.0
September	1 076 040	104.9	1 159 530	101.0	4 133 000	101.2	1 193 580	110.0	3 428 730	117.0
October	1 127 680	109.9	1 186 970	103.2	4 048 000	99.2	1 035 760	95.5	2 855 020	97.5
November	1 155 080	112.7	1 274 420	111.0	3 973 000	97.4	1 051 630	97.0	2 911 240	99.5
December	1 110 430	108.2	1 277 890	111.2	3 974 000	97.4	984 940	90.8	2 744 340	93.8
Mean	1 025 690	100.0	1 148 490	100.0	4 081 000	100.0	1 085 410	100.0	2 932 630	100.0
Annual load factor	61%		48.8%		63.6%		52.9%		64%	

increases in demand. The same data are expressed in Fig. 1.

On examination of these data it is shown that all systems have a demand for a block of energy during the summer months in excess of the average. Two California systems illustrate the extremes. The Pacific Gas and Electric Company ranges from a minimum of 93.4 per cent of the average in March to a maximum of 108.5 per cent in June, a range of 15.1 per cent. The San Joaquin Light & Power Corporation varies from 70.5 per cent of the average in February to 126.0 per cent in July, a range of 55.5 per cent. In the case of the latter company the greater range is caused by the agricultural country it serves, irrigation pumping in summer forming a large element in its power demand.

As will be shown later, the summer hump in the energy demand curve occurs at a time when the streams have fallen towards the low water period and as a result, water must be released from storage reservoirs to supply the deficiency.

Characteristics of Irrigation Systems

In the same manner as for power systems, the summer season brings a great demand for irrigation water, much of which must come from storage reservoirs, if supplied. The demand for water varies in different localities, due to varying amounts of rainfall, character of crops, duty of water and other similar elements. The presence or absence of storage reservoirs has something to do with the time when water is used and the amount. And yet, in California, no streams have been provided with adequate storage reservoirs, either for irrigation or power. In the absence of a storage reservoir the farmers reservoir may have such an effect in the Turlock and Modesto districts.

The variation in demand for irrigation water may be expressed by monthly percentages of the total amount used annually. An example is found in the following table, prepared for a region in northern California.

Table 2
Variation in Irrigation Demand

Month	% of Yearly Total
January	0
February	0
March	3
April	7
May	16
June	22
July	21
August	19
September	11
October	1
November	0
December	0
Year	100

These percentages will vary in different localities and in some cases, irrigation will extend into other months. However, the bulk of water will always be used in May, June, July and August and as in the case of power, storage reservoirs must be provided if the river is completely developed.

Characteristics of California Rivers

All streams vary in flow with the seasons but in California the variations are more marked than elsewhere. Many streams have a low water flow of only

two to five per cent of the maximum. Again the range in discharge from year to year varies. Some northern rivers range from one-half to twice the mean and southern rivers exceed this variation.

The usual California river coming from the high mountains has two types of floods. A winter flood may be caused by excessive rains in the foothill region—up to elevation 3,000 ft. Spring floods usually come from melting snows or a combination of rain and melting snow above elevation 3,000 ft. As a rule, the spring floods upon which irrigation depends, come from melting snow. These floods are not all at the same time. Due to greater elevation of the mountains, the southern rivers, San Joaquin, Kings, Kaweah and Kern have floods a month or so later than northern rivers, Sacramento, Feather, Yuba, etc. For irrigation the southern rivers are best, but in all of them the natural flow falls away

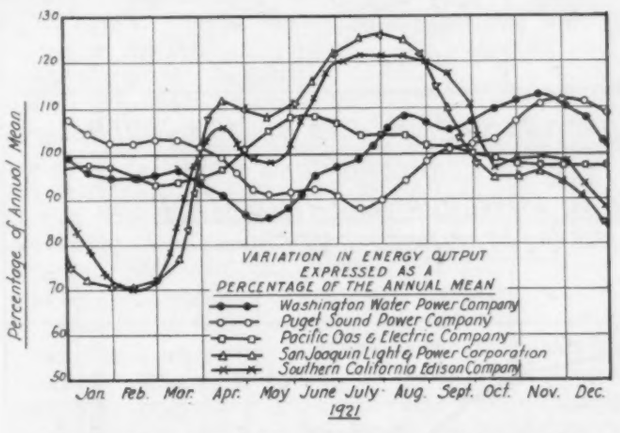


Fig. 1—Annual variation of energy output by months.

just as the greatest demand comes on—June, July and August. Hence the need of storage reservoirs.

In the study of any river for a reasonably complete development it at once becomes apparent that all the water that flows cannot be used. Storage sites do not exist nor would the expense be warranted to construct reservoirs to fully regulate the stream at all times. There are a few exceptions to this. Probably the best site for fully regulating a part of the stream is at Lake Almanor on the North Fork of the Feather River, where a reservoir site exists of 1,250,000 acre-ft. capacity that will fully conserve all water coming from about 500 sq. mi. of watershed. The general statement is true, however. It follows that in an engineering study of any river there must be taken into account a large number of factors, such as minimum and maximum stream discharge; area of land available for irrigation; size, location and cost of storage sites and the several requirements of irrigation. No stream would be developed merely for the extreme minimum discharge nor for the maximum. Probably the mean discharge is a fair statement of the amount that might be used. The power study would follow similar lines but the presence or absence of good storage sites is a large element in determining the maximum power development.

Principles of Development

It is necessary to emphasize certain basic principles for the two forms of development in order to ascertain the relation between the two.

Power

(a) Power reservoirs must be built well up to the summit of the mountains to obtain the most energy, but with sufficient watershed to fill them.

(b) Unit reservoir costs can be higher than for irrigation due to greater sale value of products.

(c) Water must be discharged at a fairly uniform rate throughout the low water period and into the winter months when streams are often low, due to freezing of sources of water.

Irrigation

(a) Irrigation reservoirs should be built in the lower foothills and on the main stream if possible.

(b) Favorable sites usually exist for such reservoirs and due to a number of causes, the cost is much less than for higher reservoirs.

(c) Water must be discharged at rates that vary widely at different times. After irrigation ceases, the gates should be closed in order to store water for next year.

(d) A power plant can usually be built at the dam of the irrigation reservoir, and energy therefrom sold at rates that will yield a substantial profit.

Proper Reservoir Sites Essential

These points need to be amplified, as the subject does not seem clear at all times. It is a rare case where reservoir sites exist in the high mountains, the development cost of which is less than an equivalent reservoir lower down. The contrary is the general rule. Again no irrigation reservoir should be built that depends upon melting snow to fill it. The snow is a storage of water and its time of melting coincides with the time of greatest irrigation demand. The irrigation reservoir should be located in the lower foothills just above the canal system so that it will fill from the runoff resulting from winter rains in the foothills, or from water discharged from power reservoirs during winter low water.

Since the irrigation reservoir must store at best only about one-third of the water passing it and diverted lower down for irrigation in any one year, the storage capacity at a given site is determined by the demand and obtained by placing the crest of the dam at proper elevation. Reservoir sites of the proper type exist on the Stanislaus at Melones; on the Tuolumne at Don Pedro; on the Merced at Exchequer; on the San Joaquin at Millerton and on the Kings at Pine Flat. Others can be obtained on the other rivers.

Economic Development of Rivers

Having in view the proper relations between power and irrigation, and having set forth the characteristics of the three variables, power demand, irrigation demand and the river, together with cer-

tain principles of reservoir construction, it is in order to show how the three can be made to work together to the best economic development. There is given in Fig. 2 a diagrammatic representation based on actual quantities of the three variable factors concerned.

One irregular line represents the hydrograph of the stream, variable year by year, but generally of this form although displaced laterally by years and by location. The typical power demand curve is that for northern California. The irrigation demand curve is based on the percentages given in Table 2. The curves are diagrammatic but represent possible conditions.

The diagram is interpreted as follows: From January up to about April 20 the natural flow of the stream is sufficient for both purposes. On that date, reservoirs above the irrigation reservoir. The size of the irrigation reservoir can be materially decreased with resulting saving in cost over that necessary if power storage is not present. The second benefit, which is much greater, is that the water stored for power in one year is carried over to the next year for irrigation and thus makes more certain the filling of the irrigation reservoir. This present season, one of the most deficient in precipitation in the history of the state, illustrates the point made.

On the San Joaquin, had the Millerton reservoir been in existence, it would have been receiving water from the storage reservoirs of the two power companies above. On the Feather, many thousand acre-feet of stored water have been discharged from Lake Almanor for power since the irrigation season of last year closed and practically all this water has

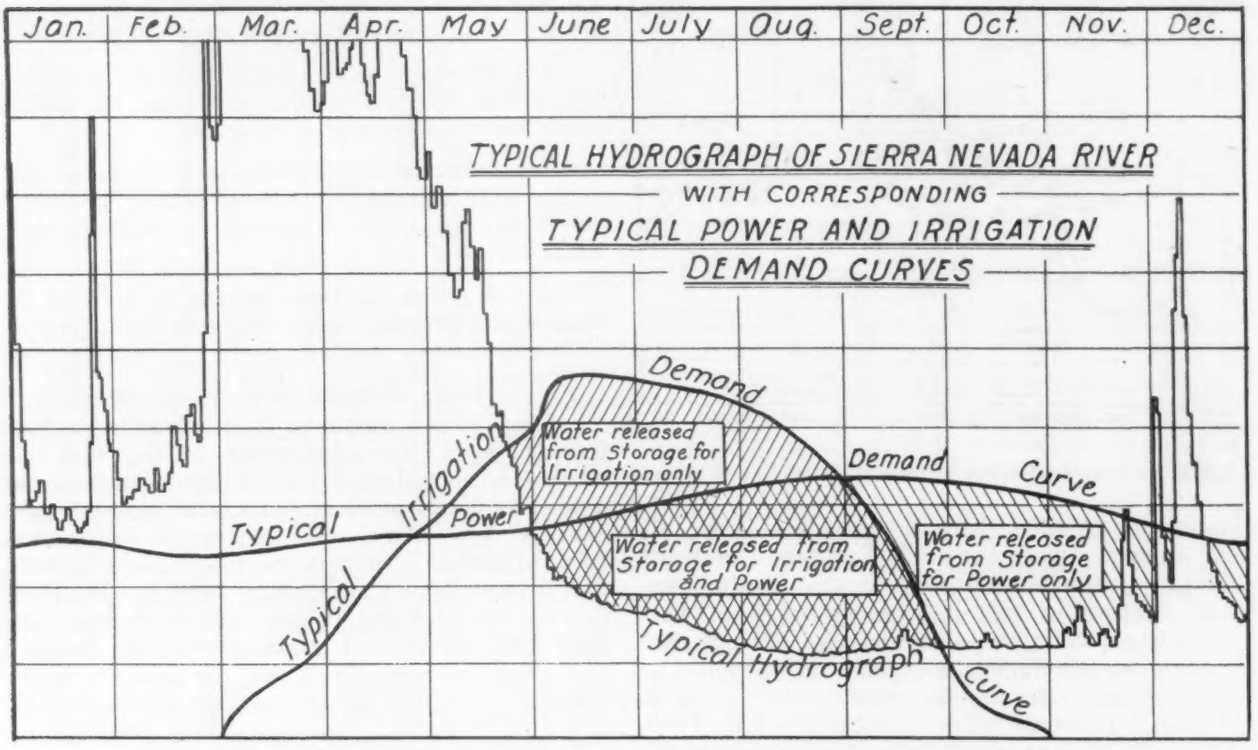


Fig. 2—Diagrammatic representation of stream flow, irrigation and power demand.

to satisfy the rising demand for irrigation water coming when the stream is falling, water is released from the irrigation reservoir. On June 1, water is first sent down from the power reservoirs. About July 1 the water from power reservoirs equals that being drawn from the irrigation reservoir. On September 1 power demand is equal to irrigation demand for water and draft on irrigation reservoir ceases, all irrigation demands being supplied by natural flow and water from power reservoirs. From this time on, and especially after irrigation ceases, the water drawn from power reservoirs is caught in the irrigation reservoirs and held over until the following season.

It will be recognized that two direct benefits to irrigation follow from the construction of power run into the sea. Had there been an irrigating reservoir of proper size on the lower river, it would have retained this water, originating in the snows of a former winter, for irrigation during this very dry year.

The plan proposed is one for the regulation of a stream over at least two years. It is the only economic way of treating a stream discharge and it illustrates that instead of there being a conflict between the two major demands for water, there is a mutual interdependence between the two because their interests are identical.

As stated in the beginning, each river is a problem by itself, limited by its special physical features and its surroundings, but to which the general plan of development herein outlined is applicable.

How Shall the Electric Range be Sold, Served and Installed?

AT its convention last year, the Northwest Electric Light and Power Association recommended that a detailed investigation of range load characteristics be made so that a sound policy of service might be worked out by central stations. Such a survey is now under way in Spokane. This article sets down some of the results which the committee hopes to achieve and the methods to be followed in reaching them.

FORWARD looking central stations have, for a number of years, realized that the electric range possesses great potential possibilities for increasing the residential load. Many have gone ahead and developed this business, believing that anything that tended to increase the use of electricity in the home would, in the final analysis, work out to the benefit of both the customer and the company. In virtually all such cases companies have installed electric ranges in customers' homes without any advance planning for the increase in the capacity of the distribution system. When the local demand grew to a point where voltage regulation was affected, additional transformer capacity was installed and secondary wires were increased in size.

To obtain this business, in competition with other fuels, an energy rate low enough to attract customers was offered; but, in reality, little was known as to whether or not the rates were adequate to cover the cost of service. Those companies which have sold ranges to their customers believe that the business is profitable and should be encouraged. They have, however, had to solve many perplexing problems in the most expedient manner as they arose.

On the other hand there are many central station men who, because of the unknown factors, have held off and to some extent discouraged the installation of electric ranges on the lines of their company. This situation is due entirely to the lack of definite information concerning the characteristics of the electric range load.

Whether or not the electric range has, up to the present time, made a profitable load for the central station company, the fact remains that these companies are confronted by a growing public demand for the electric range. The public will be served in this respect, and the question that remains to be answered by the central station company now, is whether or not it will continue to serve this business on a more or less hit-and-miss basis, or whether it will take the necessary steps to acquire reliable information about the business, so that it can be handled intelligently and at an ultimate profit.

In the electric range survey, which the Range Committee of the National Electric Light Association has undertaken in Spokane, Washington, a practical method has been devised for obtaining all of the essential information concerning energy consumption, kilowatt demand, load factor, diversity factor, demand factor, etc. With this data at hand it will then be possible to analyze the electric range load for the purpose of determining what effect the addition of a range to a central station system will mean in ultimate capital investment and what rate for this service will be compensatory as the load grows. It is of first importance that the central station company should be able to strike a balance between the growing public desire to cook electrically, and the central station company's right to supply its service at a commensurate profit.

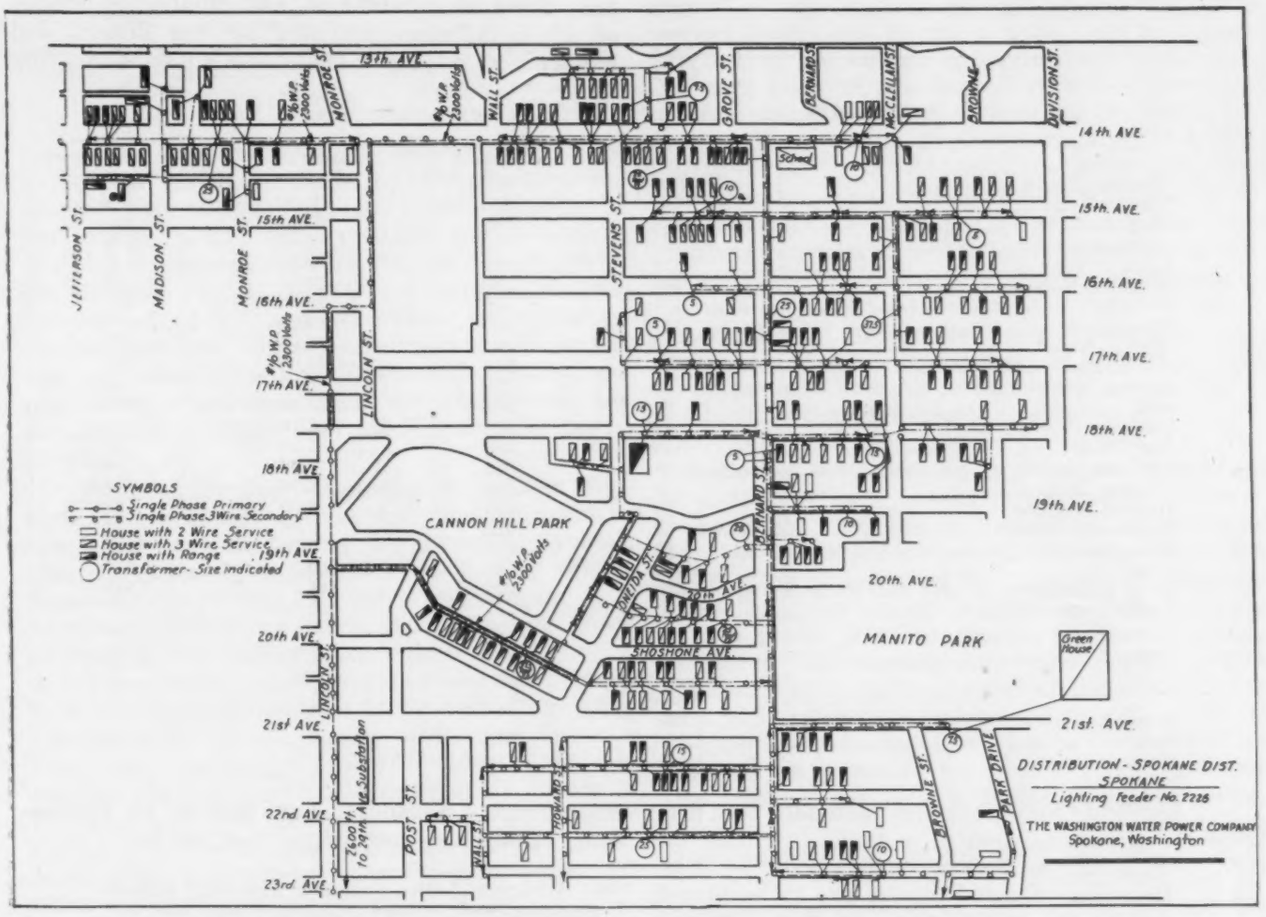
In Spokane, Wash., the Range Committee of the National Electric Light Association has selected a typical residential district for an intensive survey of the different factors involved in serving this load. This district embraces 316 customers, of whom 150 are using electric ranges. The plans of the committee contemplate the most complete and practical investigation of the characteristics of the electric range load ever undertaken in the electrical industry. While a report of the progress made thus far will be presented in detail at the Atlantic City convention, the purpose of the survey is of such vital importance to central station executives, engineers and commercial men that they should give it serious consideration. The plan as mapped out is of particular value in that definite methods have been set up whereby the problems of installation, service, maintenance and sale of electric ranges can be intelligently studied.

The actual work of collecting the data which has already been started in Spokane is the crystallization of the effort of many commercial men and the direct result of the commercial section of the Northwest Electric Light and Power Association, working in conjunction with the Range Committee of the National Association. For some years central station men have been endeavoring to obtain by individual effort more definite information concerning the electric range load. In the states of Oregon, Washington, Idaho, Utah and Montana, there are in service at this time approximately 40,000 electric ranges. Several of the utility companies have considerably more than 5,000 ranges on their respective systems and the number is growing rapidly. There are some small towns in which there is a range in every other residence. Thus it will be seen that electric cookery is not only practical, but there is also a very insistent demand in the mind of the public for this service.

A typical urban residential district has been chosen for the Spokane electric range survey. The accompanying pictures show some of the residences in the district as well as one of the streets. To the right is the interior of the kitchen in one of the homes. Of the 316 homes supplied by a single feeder 150 have electric ranges. The average connected load per consumer is 7.3 kw.

That electric ranges can be sold in quantities at present prices has been amply demonstrated in the results accomplished by the utilities in the Northwest. So after careful consideration of this field with the view to selecting the most typical section in which to conduct a field survey, the residential district in Spokane has been chosen.

How well this particular district is suited for such an investigation may be seen by the accompanying map, showing the location of residence services in an area supplied by one lighting feeder. In this section there are 316 residential customers and 150 of them, well distributed throughout the area, are using electric ranges. The entire district is supplied from a single feeder with the transformer and range service locations indicated on the map. The photographs taken of the streets in this section show the type of residences served.



A map of the residential district in Spokane where the present survey is being made showing the location of homes containing electric ranges, the feeder serving the district and the various transformers. There are 316 residences and 150 electric ranges.

The Range Committee has already sent out a questionnaire to each of the residential customers in the district from which complete information on the total connected appliance and lighting load of each residence has been compiled. A summary of this information is shown in the accompanying tabulation. From this point the Range Committee purposes to carry on its investigation by means of separately metered circuits and services extending over a period of at least one year.

With these preliminary arrangements completed, the committee is in a position to go ahead and obtain accurate information on energy consumed, demand, demand and diversity factors of the range load, what investment in the way of additional plant, transmission and distribution systems is necessary when the load reaches different saturation points, such as one range to every ten customers, one range to every four customers, one range to every two customers and so on. The cost of getting such data in really reliable form will of course be considerable and the committee has outlined four different methods varying in cost which will be submitted to the executive committee of the National Association with the request that it approve and make available the fund necessary to carry out the survey under the methods that will develop the greatest amount of useful data.

Method of Making Survey

1. Approximate method. This provides for a comparatively simple study of a large number of range customers. Graphic demand or wattmeters to be installed at a substation and all transformer locations supplemented with readings of the customers' meters over a period of one week will give

data from which approximate information can be obtained. The cost of this and the three other methods is estimated on the basis of the feeder shown on the map. The installation and expense, freight and traveling expenses are figured on the basis of 20 set-ups. Salaries for engineer and assistant cover a period of a year.

20 Westinghouse Type R.A. demand meters	$ 2,400
40 Current transformers	1,000
20 Cabinets equipped for pole mounting	200
Installation expense	4,000
Freight and traveling expense	2,000
Engineer and assistant	5,400
Total	15,000
Less salvage on meters which it is proposed the member companies take off our hands	2,000
Net cost	$13,000

3. Distant Dial Method. This provides for a standard Sangamo watt-hour meter equipped with a special contact-making device in the register which by sending impulses over a low voltage pressure circuit will register the summation readings of a group of ten watt-hour meters on one meter dial located at a distance. By equipping this distant dial with a standard General Electric printometer and plotting the differences indicated by this printometer a load curve can be obtained which would be a curve of the aggregate demand of the group of ten installations. By the use of a Warren motor drive it would be possible to synchronize the operations of any number of different printometers so that simultaneous records could be obtained on any number of groups of 10 installations actuated by the distant dial method and thereby a load curve obtained showing the aggregate demand of any number of installations. Under this method the cost will be:

150—15-ampere, 3-wire Sangamo watt-hour meters equipped with contact making devices and installed on range circuits	$ 3,250
15 G.E. Co. printometers with Warren motor drive and contact devices installed	2,625
15 Sangamo distant dial installed	400
1—1-hp. a.c. d.c. motor generator set or storage battery for energizing control circuit	150
150,000 ft. of telephone duplex pair control circuit installed, 5 set-ups	3,000
150 homes wired in with standard telephone wiring to range meter, 5 set-ups	6,000
Miscellaneous installation expense	4,875
Freight and traveling expense	2,000
Engineer and assistant	5,400
Total	27,700
Less salvage on meters which it is proposed the member companies take off our hands	3,700
Net cost	$24,000

CONNECTED LOAD SURVEY, 314 CONSUMERS

Appliance	Total Number	Number per Consumer	Total Kw. Connected Load	Watts Connected Load per Consumer
Electric Range	159	.507	1,130.00	3,600
Water Heater	149	.475	120.00	382
Flat Iron	322	1.02	193.00	614
Vacuum Cleaner	256	.815	45.00	143
Curling Iron	156	.497	2.35	7.5
Washing Machine	153	.488	30.70	98
Toaster	171	.545	85.50	272
Percolator	140	.447	56.10	178
Waffle Iron	92	.294	55.00	175
Air Heater	73	.233	44.00	140
Sewing Machine	69	.220	6.90	22
Grill	61	.195	36.90	117
Heating Pad	42	.134	2.10	6.7
Hot Plate	31	.099	31.20	99
Vibrator	28	.089	2.80	8.9
Chafing Dish	9	.029	2.70	8.6
Ironing Machine	6	.019	9.00	28
Immersion Heater	7	.022	3.50	11
Miscellaneous	22	.070	5.75	18.3
Total	1,946	6.2	1,862.5	5,930
Total exclusive of Ranges and Water Heaters	1,638	5.2	612.5	1,948
Lamp Sockets	8,640	27.4	432.0	1,370
Grand Total			2,294.5	7,300

	Total Number	Number per House
Rooms	2,440	7.75
People	1,210	3.86
Maids	75	.24

2. Duplicate Secondary Bus Method. This provides for the installation of a duplicate circuit on each transformer secondary where survey is to be made. Recording demand meters are to be placed on this bus at the transformer and data obtained similar to the approximate method. Each range customer will be provided with a duplicate service loop since the lighting and range services are on the same set of service wires. The cost is as follows:

20 Westinghouse Type R.A. demand meters	$ 2,400
40 Current transformers	1,000
20 Cabinets equipped for pole mounting	200
550 cwt. copper wire, 5 set-ups	8,000
Miscellaneous material, 5 set-ups	500
Installation expense (meters)	4,000
" " (wires)	1,000
Freight and traveling expense	2,000
Engineer and assistant	5,400
Total	$24,500
Less salvage on meters which it is proposed the member companies take off our hands	4,500
Net cost	$20,000

4. Individual Printometer Method. This provides for the installation of a printometer on each range circuit. Each printometer is to be equipped with Warren motor drive so that it is possible to synchronize the operation of all of them. A watt-hour meter of standard type on which is mounted a contact device for operating the printometer will be installed at each range service.

150 G.E. Co. printometer with Warren motor	$24,915
150 W.H. meters with contact device	2,585
Installation expense	5,000
Freight and traveling expense	2,000
Engineer and assistant	5,400
Total	39,900
Less salvage on meters which it is proposed the member companies take off our hands	12,400
Net cost	$27,500

Combination of Methods Recommended

Of the various methods, 1 and 2 represent the smallest expenditure, but the results obtained at best would be only approximation and no way is provided to separate the lighting and range loads. On the other hand, method 3 or 4 will give accurate and dependable results based entirely upon recorded data and not involving any assumptions as to important but unknown factors. The committee has therefore wisely recommended that a combination of the distant dial and individual printometer method be adopted.

The need for this information in its most complete form is becoming more and more apparent as the actual work of making the survey in Spokane goes on. There have been many conflicting reports regarding the diversity of the range load and it is important that authoritative information be made available at the earliest possible date. For instance, in the preliminary survey of the districts in Spokane, it was found that on a feeder consisting of 314 residences having 160 ranges and water heaters, there was a five-minute peak of 420 kw. at the substation. This peak was taken during the month of February with the indication that it was higher earlier in the winter and such figures do not appear to coincide with similar data which have been collected and published on the electric range load.

Range Policy Dependent on Accurate Data

At the present time no utility is able to state definitely whether the electric range increases the system peak 500 watts, 1 kw. or 3 kw., and no central station is yet able to forecast what capital investment will have to be made to take care of the range load in future years. All data gathered so far depend to some measure upon approximation and until accurate data are secured a sound range policy cannot be set down. From the experience of the companies in the Northwest it is only a question of time before electric ranges are generally used throughout the country and it is well-nigh imperative that the fundamental facts be ascertained on which to predicate remunerative rates and to plan distribution systems suitable for supplying both range and lighting loads in residential areas.

If such information is not developed there is grave danger that the electric range load will be permitted to grow haphazardly and get so far out of hand as to create a situation, from the standpoint of rates, distribution capacity, investment and so on similar to the question of power factor regulation brought about by the enormous increase in induction motor load during the last five years.

Spokane Survey Will Serve Three Purposes

The Range Committee so far has gathered together much valuable information on the subject. It is, however, confronted by the fact that all available data are at best of a fragmentary nature which cannot be combined or presented in a composite manner from which definite principles can be evolved. In starting the survey in Spokane due recognition has been taken of this lack of reliable information and a practicable method is proposed for finding out many unknown facts. The work which is being conducted in Spokane should have the support of every central station man in the industry. From the executive viewpoint it will provide the necessary data from which he can determine the capital investment necessary to serve this business, what rates are necessary to make range service profitable and to what extent he should go in further developing the business. For the central station engineer data to be collected will be particularly valuable in that it will be possible to establish certain formulas for laying out distribution systems to meet the probable future demand. The collection of these data by engineers will give them an ideal opportunity to observe the characteristics of this load as it develops on the individual customer's premises, in groups of three or more, and the consequent effect the demand has upon distribution and substation transformers as well as upon the total system peak. For the commercial man the completion of this investigation will establish definite knowledge as to the desirability of the electric range as a load and revenue builder and he will be relieved of the present necessity of trying to analyze the value of the business from a basis of vague assumption with but few definite facts. It will enable him to devote his attention to methods of selling and maintaining service on the electric range.

In this investigation it is fortunate that the executive, the engineer and the commercial man will be so drawn together by a common interest. It will enable each to study and consider the other's problems, which should make for a much better understanding on the part of all three of the difficulties which each must overcome.

Whether the individual central station company has been actively engaged in building the electric range business or not, there is a very strong inclination on the part of many people to want to cook electrically. It is more than mere curiosity and when there is such a general demand the public will be served, somehow. If ample provision is made so that this range survey may be carried through to completion, central stations will no longer be working in the dark as to the characteristics and requirements of the electric range, but will be able to plan for and take on this business in an intelligent manner.

Fostering the Family Spirit Among Utility Customer-Owners

THROUGH the columns of its house organ the Southern California Edison Company has endeavored to acquaint its owners with some of the children who are also holders of company stock. The company's motive was to develop the idea that all Edison stockholders are "Edison Partners."

DEVELOPED to the highest degree, the policy of customer ownership of public utilities has, as its ultimate aim, the inculcating into the minds of the stockholders the feeling that they are partners in the enterprise that serves them. When the stockholder feels that his money is invested in a concern that offers safety of investment, pays him a satisfactory dividend rate and at the same time provides him with a necessary service at a reasonable rate, he is inclined to regard the company as his company and himself as a partner in the enterprise.

The advantages of the principle of customer ownership are numerous. Both the individual and the utility are benefited by the practice. The investor gains in that he knows that his money is invested in a concern that is providing himself and his neighbors with essential service, and since he is on the ground to watch the operation of the company he is in a position to tell whether or not his and his friends' money is being administered wisely. The utility gains in that it secures the active support and good will of many persons that might otherwise be only tacitly friendly.

It is evident, then, that the fostering of the partnership feeling is to be desired by both the individual stockholder and the utility. The stockholder is anxious to know what is being done with his money and what plans are being made by the company in which he is a partner for future developments in order that the service which the company is rendering may be maintained at the proper level. The utility anxious to keep up the support and good will of its stockholders, is equally desirous of developing the partnership feeling among its customer-owners.

To secure this partnership feeling of its customer-owners, the Southern California Edison Company, in common with other Western electric public utility companies, has been supplying information concerning the activities of the company, to its stockholders through the medium of a company house organ. In "Edison Partners," the company has been telling of what the company has done and what it intends to do. The purpose has been to inform the owners as to what is being done and to make them feel more firmly that they are actually partners in the company.

Deviating from the practice of telling about the activities of the company, the April issue of "Edison Partners" was dedicated to the "Junior Partners." The purpose of this issue was to get the company's stockholders to realize that, in addition to a large number of persons of mature age, there are numerous children that are also partners in the enterprise.

According to the records of the Southern California Edison Company there are 1,450 minors that are owners of company stock. In the recent issue it was the plan to present these younger partners to the rest of the "Edison Family" in order that the family spirit might be furthered among the customer-owners of the company.

Plans were made for the securing of the photographs of the "Junior Partners" and in the January issue of the company house organ it was announced that the editor was anxious to secure pictures of all children in the families of Edison company stockholders. The request stated that informal pictures were wanted in order that the older members of the "Edison Family" might know what the younger generation looked like.

Immediately following the announcement that the company desired to secure the photographs of the children, pictures began to pour into the editor's hands. Each photograph carried the name of the child together with the address of the sender. A total of 250 pictures was received during the time that elapsed between the announcement and the time that the next issue of the magazine went to press. Only six of the pictures arrived too late to permit the editor to insert them in the group of "Junior Partners."

Four pages of the company magazine were devoted to the pictures of the children, a total of 244 pictures appearing therein. The first page of the issue presented a story concerning the "Junior Partners" and called attention to the large number of children who already owned stock in the company.

Upon receipt of each picture, a personal letter was sent to the parent of the child expressing appreciation for the cooperation. After the composite reproduction of the photographs was printed in "Edison Partners" a print of the entire four pages was mailed to each parent.

According to those in charge of handling the pictures, many exceedingly cordial letters were received from the parents of the children and all of these letters indicated that the writers were glad to be classed as members of the "Edison Family." The letters that were sent out following the receipt of the photographs were of semi-personal nature and furthered the family spirit among the recipients.

Four pages, similar to the one reproduced above, were used to present the pictures of 244 "Junior Partners" in the Southern California Edison Company.

COAST Outlet
ELECTRICAL CONSTRUCTIONISTS' and DEALERS' NEWS

Electrical Construction

By E. Earl Browne

IT was at one time the custom to make up estimates on any old piece of paper at hand. Many contractors used note books, either loose-leaf or bound, and the data were recorded in hit-or-miss fashion. Very often a successful bidder discovered after the bid had been let that he had left out items of material or labor that increased his cost and decreased his potential profit. It happened all too often that these forgotten items amounted to more than the small margin that had been figured for profit.

Gradually the use of various forms for estimating came into practice and there were developed some very elaborate forms that went into great detail as to items. Many of these were expensive to use on account of the time consumed in filling in the information and also because they were cumbersome or awkward to handle. This resulted in increasing the time required for estimating and increased the cost of this particular part of the work. In view of the relatively small portion of estimated work that is ultimately closed to contract, this expense was often considered out of proportion to the benefits received.

The matter of forms for estimating received considerable attention from various individuals and from the many associations, such as the Association of Electragists, International; the various local associations, and the state organizations. The San Francisco Association of Electrical Contractors and Dealers gave this matter extensive study and finally brought forth a set of forms that have worked well and have been economical in time and have eliminated the possibility of forgotten items.

Figs. 3, 4 and 5 are samples of the same job estimate as illustrated in Figs. 1 and 2 in the May 1 issue of the Journal of Electricity, except that it is shown on a set of forms gotten out by the San Francisco Association of Electrical Contractors and Dealers. The saving in time in listing and pricing the items when the form sheet, as shown in Figs. 1 and 2, is used is self-apparent as there is a total of but fourteen items to be priced, whereas in the detailed form there is a total of 259 items.

It will be noted that the difference in the final estimate totals is but 1/3 of 1 per cent, which is considerably more accurate than any estimator's figures on the quantity "take off" from the plans and specifications, and, as stated before, the feeling of certainty that no items of material or labor to install same are omitted greatly overbalances any such small seeming inaccuracies as shown by comparison of the two forms.

Both forms are designed primarily for conduit work, although the one shown in Figs. 3, 4 and 5 can be used for a knob and bushing or combination conduit and knob and bushing job where all outlets, circuits, feeders, sub-feeders, etc., are taken off in de-

SERVICES AND FEEDS AND SUB FEEDS

FROM	TO	Dist. One Way	WIRE No.	WIRE Size	CONDUIT ½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	WIRE No. 14	No. 12	No. 10	No. 8	No. 6	No. 4	No. 3	No. 2	No. 1	1/0	2/0	3/0	4/0
Main Service		40	3	1					40														120				
Meter Board	Store #1	55	3	10		55											165										
"	" S.#2	55	3	10		55											165										
"	2nd "Floor	50	3	12		50										150											
"	3rd "Floor	60	3	12		60										180											
"	4th "Floor	70	3	12		70										210											
"	5th "Floor	80	3	12		80										240											
Totals						370			40							780	330						120				

Fig. 3.

tail instead of the unit price per outlet method as employed by many contractors in figuring residences and flats. To illustrate the completeness of the material lists in the price form used in conjunction with Figs. 1 and 2 the following will serve to convince anyone of its value:

Ceiling and Bracket Outlets—
- 1—No. 54151 Box
- 1—No. 54 C 3 Cover
- 1—½-in. Fixture Stud
- 6—½-in. Locknuts
- 3—½-in. Bushings

S. P. Push Switches—
- 1—No. 52151 Box
- 1—No. 52 C 14 Cover
- 1—No. 4401 Switch
- 1—No. 4077 O.B. Plate
- 2—½-in. Locknuts
- 1—½-in. Bushing

Single Convenience Outlets—
- 1—No. 52151 Box
- 1—No. 52 C 14 Cover
- 1—No. 5547 Receptacle
- 1—No. 5548 O.B. Plate
- 1—No. 5419 Cap
- 4—½-in. Locknuts
- 2—½-in. Bushings

Panel Board (10 circuits)—
- 1—Cabinet
- 1—Door and Frame
- 1—Panel Board
- 4—Guther Linings
- 20—Fuses
- 20—½-in. Locknuts
- 10—½-in. Bushings
- 2—1-in. Locknuts
- 1—1-in. Bushing

100-Amp., 250-Volt, 3-Pole Service Switch—
- 1—No. 40323 (T) Switch
- 3—100-Amp., 250-Volt Fuses
- 1—1½-in. "E" Condulet
- 1—3-Wire Cover
- 2—1½-in. Locknuts
- 1—1½-in. Bushing.
- 3—No. A 4 Federal Bushings.

Fig. 4.

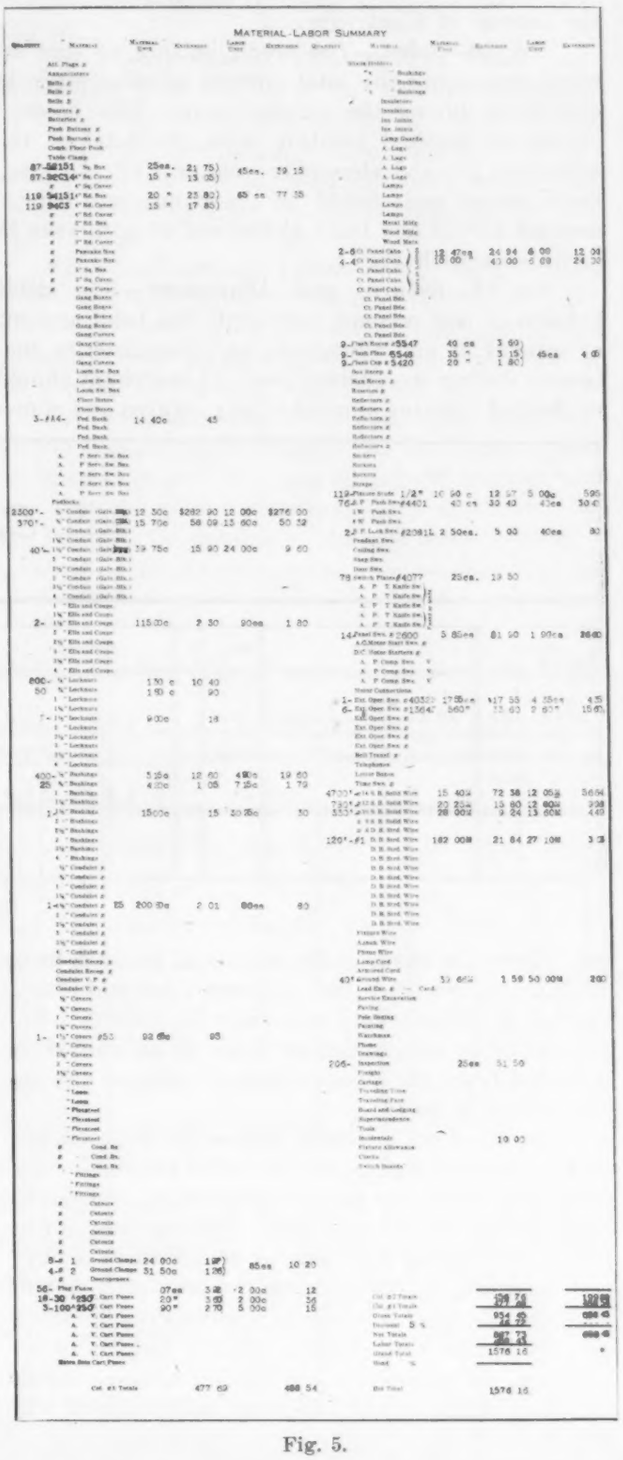


Fig. 5.

A Practical System of Accounting for Contractor and Dealer

By F. V. Mitchell

THE following is a continuation of the General Ledger Account. The preceding items of this account appeared in the May 1, 1924, issue of the Journal of Electricity.

No. 50—Sales.—The credit balance of this account represents the total amount of sales made to customers during the current year. This account should be credited monthly with the total of the sales-jobs Cr. and store Cr. columns of the cash book-journal and should be closed out into capital account (profit and loss) at the end of each year in accordance with Fig. 1.

No. 51—Returns and Allowances.—The debit balance of this account represents the total amount of returns of and allowances on sales made to customers during the current year. This account should be debited with the amount of any returns and allowances from the sundries Dr. column of the cash book-journal, the credit to the customer's accounts being entered in the accounts receivable Cr. column. Any returns of or allowances on cash sales should be deducted from the amount of cash sales on the day the refund is made.

No. 52—Cost of Goods Sold.—The debit balance of this account represents the total amount of material and labor used on jobs finished and store sales made during the current year. This account is debited at the end of each closing period when a physical inventory is taken, with the cost of merchandise sold and labor consumed as outlined under analysis of accounts Nos. 10, Merchandise, and 11, Labor. It should be closed out into capital account (profit and loss) at the end of each year in accordance with Fig. 2.

No. 60—Advertising.—The debit balance of this account represents the total amount expended for advertising purposes during the current year and should be debited with all amounts of this nature, from the sundries Dr. column of the cash book-journal.

No. 61—Automobile Expense.—The debit balance of this account represents the total amount expended during the current year for the upkeep and operation of all automobiles used in the business. This account should be debited monthly with the total of the auto expense Dr. column of the cash book-journal.

No. 62—Depreciation.—The debit balance of this account represents the total amount of depreciation charged off on fixed assets during the current year. This account should be debited at the end of each closing period with the proper percentages of depreciation as outlined under the analysis of Provision for Depreciation, Accounts Nos. 20-A, 21-A and 22-A.

No. 63—Doubtful Accounts.—The debit balance of this account represents the total amount that it is estimated will be lost out of current year's net charge sales due to uncollectible accounts. This account should be debited at the end of each closing period with one per cent of the net charge sales as outlined under the analysis of account No. 3-A, Provision for Doubtful Accounts.

No. 64—Freight, Drayage and Express.—The debit balance of this account represents the total amount paid for freight, drayage and express on merchandise received during the current year. This account should be debited monthly with the total of

ACCT. NO. √√

Cost Of Goods Sold

DATE 19x3		ITEMS	FOL.	√	DEBITS	DATE 19x3		ITEMS	FOL.	√	CREDITS
Dec.	31	Merchandise	1√		1x03√60	Dec.	31	Profit & Loss	1√		18√44√95
	31	Labor	1√		6√1√35						
					18√44√95						18√44√95

Fig. 1.

the freight, drayage and express Dr. column of the cash book-journal.

No. 65—Heat, Light and Power.—The debit balance of this account represents the total amount expended for heat, light and power during the current year. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 66—Insurance.—The debit balance of this account represents the total amount expended for insurance during the current year. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 67—Interest and Discount.—The balance of this account represents the difference between the amount of interest and discount paid and the amount received during the current year. If the amount paid is more than the amount received, the account will show a debit balance; if less it would show a credit balance. This account should be debited and credited monthly with the totals of the Interest and Discount Dr. and Cr. columns, respectively, of the cash book-journal.

No. 68—Miscellaneous Expense.—The debit balance of this account represents the total amount expended for incidental items of expense during the current year that are not covered by the other specific captions of expense accounts. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 69—Rent.—The debit balance of this account represents the total amount of rent paid during the current year and should be debited with the amount of rent paid monthly from the sundries Dr. column of the cash book-journal.

No. 70—Salaries.—The debit balance of this account represents the total amount of salaries (exclusive of labor account, No. 11) paid during the current year, and should be debited monthly with the total of the salaries Dr. column of the cash book-journal.

No. 71—Stationery, Printing and Office Supplies.—The debit balance of this account represents the total amount expended during the current year for stationery, printing and office supplies. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 72—Taxes and License.—The debit balance of this account represents the total amount of taxes and license paid during the current year, and should be debited with all such amounts from the sundries Dr. column of the cash book-journal.

73—Telephone and Telegraph.—The debit balance of this account represents the total amount paid for telephones and telegrams during the current year and should be debited with all such amounts from the sundries Dr. column of the cash book-journal.

ACCT NO 50

SALES

DATE 19x3	ITEMS	FOL.	DEBITS	DATE 19x3	ITEMS JOBS	ITEMS STORE	FOL.	CREDITS TOTAL
Dec 31	Profit & Loss	12	x78174.0	Jany 31	1985.65	320.20	1	x3065.85
				Feby 29	1853.40	413.75	2	x2267.15
				Mch 31	x041.85	426.30	3	x468.15
				Apr 30	x136.70	412.65	4	x549.35
				May 31	1955.55	370.70	5	x2326.25
				June 30	1836.40	314.95	6	x1501.35
				July 31	1928.65	306.80	7	x2235.45
				Aug 31	1943.10	328.75	8	x2271.85
				Sept 30	1876.45	357.10	9	x1833.55
				Oct 31	1793.90	392.25	10	x1186.15
				Nov 30	1786.75	475.80	11	x2262.55
				Dec 31	1717.60	952.05	12	x2669.65
			x78174.0		x9856.00	x032.40		x78174.0

Fig. 2.

A Cooperative Opportunity for Electrical Dealers

A new field of display is now open to progressive electrical dealers. The Chester N. Weaver Company, San Francisco and northern California distributors for the Studebaker automobile, desiring to extend the field of their service to other industries, arranged with the Pacific Radio Trades Association to conduct a joint display of automobiles and radio equipment. The keynote of the display was the slogan "Radio all summer, this summer." No attempt was made to force the automobile to the front in the display or in the advertising, all of which was done by the company. Instead, the main feature of all publicity was the radio equipment that was on display throughout the entire building of the automobile company. Every effort was made to draw the public to the display rooms to see the radio sets, some of which were in operation. The sales rooms were attractively decorated with branches, grass, sand and pebbles to give the appearance of a summer camping ground and the impression was heightened by the addition of a limited amount of camping equipment. This style of decoration showed the radio equipment in a vacation environment and lent much to the effectiveness of the exhibit.

The importance of radio apparatus for summer vacations formed the keynote of the joint publicity program of the Chester N. Weaver Company and the Pacific Radio Trades Association. Radio sets were on display throughout the automobile sales room and radio concerts were daily features.

Each person entering the display rooms was given a numbered coupon ticket, one part of which was to be deposited in a locked box and the remaining part to be held. At nine o'clock each evening a drawing was held and the holder of the first ticket drawn from the box, if present at the time of drawing, was presented with a radio set. A different make of set was given away each night of the week and the sets were furnished by the individual members of the Pacific Radio Trades Association. Radio concerts were given during the evening, preceding and following the drawing, and music was also furnished by a Hawaiian orchestra, all of the members of which were employees of the automobile dealer. The only expense to which the radio equipment dealers were put was to furnish the sets and to have competent salesmen on hand all of the time the sales room was open in order to explain the apparatus.

This unusual example of cooperation between two different classes of business resulted to the advantage of both and was declared highly successful, so successful, in fact, that it has already been requested that a similar cooperative display be made in another city. The event was extensively advertised by the automobile dealer both before the opening of the display and during the week in which it was held. This resulted in an average nightly attendance in excess of two thousand persons; the attendance in the afternoons being somewhat less. It is estimated that between fifteen and twenty thousand people had the opportunity to learn of radio equipment and its operation, and the major portion of this number listened to the short talks on radio operation that were given each night just before the drawing for the prize. These talks were made by radio experts and engineers and were non-technical. The sales as a result of this display cannot at this time be definitely stated but it is certain that the exhibitors were more than satisfied with the benefits derived and are enthusiastically seeking opportunity to stage similar demonstrations. The strong appeal of the automobile coupled with the interest in radio and electrical goods combine to make this type of demonstration effective in almost any locality.

I. M. Peckenpaugh, graduate of the Polytechnic College of Engineering, Oakland, Calif., and formerly in charge of motors and electrical construction for the United States Government naval service, has opened a contracting business at 707 Heliotrope Drive, Los Angeles, Calif. Through Mr. Peckenpaugh's recent connection with the service department of the Western Electric Company, he has been appointed exclusive service agent for that company.

Code Discussion by Sacramento Contractors and Wiremen

The engineering committee of the Contractors' and Dealers' Association of Sacramento and the City Electrical Department recently met with the local journeymen electricians to discuss the 1923 edition of the National Electrical Code. The meeting was attended by M. P. Canon, R. J. Finchley, E. M. Miller, and R. N. Phelan of the Contractors' and Dealers' Association, and Carl W. Beaton of the Sacramento Electrical Department. The discussion of the most important changes in the new Code was based on the articles by Claude W. Mitchell which have appeared in the Journal of Electricity. These were supplemented by memoranda of the association secretary and Carl W. Beaton of the Electrical Department. Two different samples of the new unit type of service switch were displayed and discussed. A general discussion followed and specific questions were answered by the engineering committee and the city electrician.

EMF Electrical Year Book Published.—The third annual edition of the EMF Electrical Year Book has been issued by the Electrical Trade Publishing Company, Chicago, Ill. It has been completely revised and contains a total of 1,550 pages. Of these 1,080 form the main reference text. In this text a conspicuous feature is the listing of manufacturers of almost every conceivable electrical product under some 3,200 classifications of equipment, over 7,000 manufacturers being represented. There are also over 7,800 separate trade name entries. The technical information includes over 5,900 definitions of electrical words and 600 encyclopedic topics on the various branches of the electrical industry and its leading activities.

The old "wise crack" to the effect that the building would stand, etc., is not to be charged against L. M. McGinnis of Sacramento, Calif., for his support in the future is to be given to the Lighting Fixture Dealers' Association of that city. The "Champion Two-Fisted Smiler" of Sacramento has recently been elected president of the aforementioned association. Mr. McGinnis receives mail addressed to Manager, Fixture Department, Scott Plumbing & Electrical Company.

Suggestions to the Amateur on Radio Installations

By J. M. EVANS
City Electrician, Modesto, Calif.

Radio installations have become so numerous and so many more are projected that the radio business seems to have one of the greatest immediate futures in the matter of volume. The increasing number of sets of varying hook-ups have frequently shown that some apparently proper methods will not give results. And poor results are not the only disturbing feature.

In some instances, antenna masts have fallen, causing personal injuries. Every effort must be made not only to see that the installation works satisfactorily but also to insure the utmost safety. For example, the pole must be substantial, at least 4 in. x 4 in., of good lumber, and should not be less than 3 in. x 3 in. of clear straight grained Oregon pine. If the pole is to be taller than thirty feet these dimensions must be increased. Each mast should be guyed at least four ways with galvanized iron wire, using not smaller than No. 12 B. & S. gage. At least two standard strain insulators should be inserted in each guy wire; one near the point of attachment to the mast and one not closer than eight feet from the ground, or roof, or surface under the guy. If the guy is more than forty feet between insulators another insulator should be inserted halfway between the two above mentioned. An ordinary porcelain cleat or knob as used in house-wiring will **not** do.

Too small wire must not be used for the antenna. This wire must be No. 14, or larger, B. & S. gage copper, and the lead-in and ground wires should be the same size if of copper, but No. 17 copper-clad steel may be used. The lead-in and ground wires should be kept at least four inches from any other wire. For receiving station installations (and the following applies **only** to receiving stations) the lead-in and ground wires should be kept at least two inches from the walls, adjacent surfaces, floors, etc. An ordinary porcelain tube or a piece of flexible non-metallic conduit, called loom, will not do for bringing the wires into the house. A wall bushing that will keep the outside wires at least two inches from the wall and one that slopes up towards the inside to keep the rain from running into the house must be installed. There are a number of reasonably cheap lightning arresters that will operate at 500 volts or less. This must be installed so that it will have a separate ground from the ground on the set. In addition to this, an antenna grounding switch is recommended. This is the one place in which fuses **must not** be used.

The set ground and the lightning arrester ground should be kept two inches from all walls, floors, etc., and should be fastened to a water pipe with standard ground clamps.

The foregoing rules are embodied in Ordinance 121, N.S., of the City of Modesto, Calif., passed in 1918, which also requires that all radio installations be inspected by the city electrician.

One very common fault of the amateur set is to try for too good an aerial. In this as in other things the simpler construction is usually the better. An L aerial will probably give best results. It should be of one wire, at first, and not too long, as the lead-in works as part of the aerial. If possible to avoid, power wires, tin roofs, etc., should not be paralleled with the aerial. A set probably will work very poorly if any part of the system is in metallic conduit. Many bends in the wire will frequently be another cause of trouble.

If a set squeals the noise may not be in the set itself. A regenerative set near may cause this trouble. Regenerative sets to the neighbors, radio-ly speaking, are like crying babies in an opera.

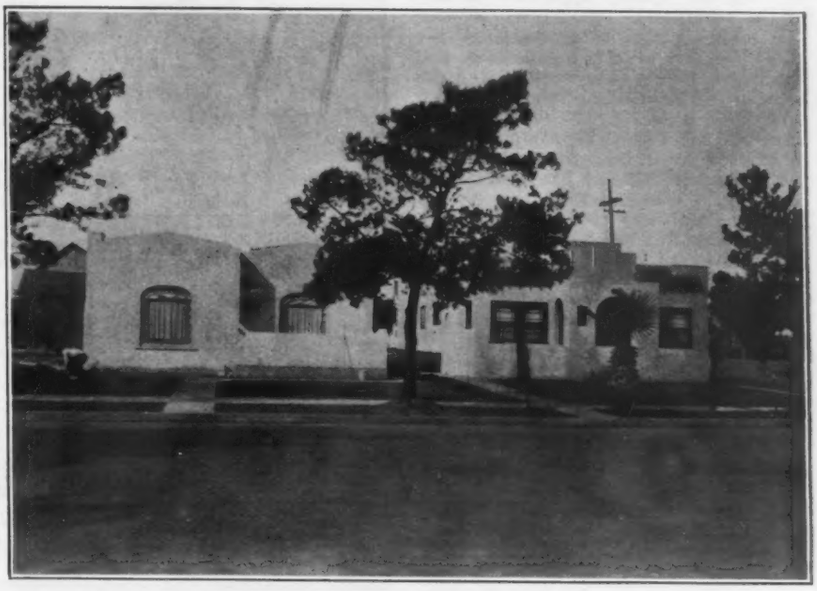
There are very strict rules that must be followed in the construction of transmitting stations and one who is planning to install such a set will find it to his advantage to consult the local city electrician before buying. There have been fires, in Modesto, caused by improperly installed radio sets. In those cases where the local ordinance has not been adhered to the insurance companies are slow to make full adjustment.

San Diego Contractor Builds Only All-Electric Homes

Oscar Dorman, building contractor of Coronado, without any thought of doing anything else, and in quite a matter-of-fact manner, is building one electrical home right after another and selling them like hotcakes, according to W. A. Lambert, district agent of the San Diego Consolidated Gas & Electric Company at Coronado. Mr. Dorman's homes are generally sold before they are completed and the demand continues for his convenient, moderately priced homes, fully electrically equipped.

So complete electrically are the little bungalows which this builder erects, that no provision is made for gas or other fuel anywhere in the houses. They are wired for electric ranges, are equipped with electric room heaters and water heaters, and the lighting is designed with care. Outlets are plentifully provided, making for convenience in housekeeping in the small houses.

While Coronado is a community of many large and elaborate electric homes, the homes of millionaires and retired people, the moderate class of residences built are of exceptionally high order, with electrical conveniences ranking high in percentage to population. The homes built by Mr. Dorman are generally five and six-room California bungalows.



Two of the recently completed, moderately priced, fully electrically equipped homes built in Coronado by a progressive builder specializing in electric homes exclusively.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of the inquiry.

Question:

Referring to your answer in the Journal of April 15, 1924, explaining how to handle Lease Contracts discounted on the books, please advise how that account should be shown on the balance sheet.

Answer:

The balance due the dealer by the customer would be included in the total of Accounts Receivable and the net amount due the discount corporation by the dealer should be deducted from that total. After the down payment of $13 was collected by the dealer the balance of the April 15, 1924, transaction would show in the statement of condition as follows:

Accounts Receivable	$132.00
Less Discount Corp.	118.80
Net amount due dealer (10% withheld)	$ 13.20

JOBBER, DEALER AND SALES AGENT

Introducing the New Product on a Broad Scale

Meetings and Advertisements Used to Inform Consuming Public of Advent of New Types of Electric Motors

A few months ago the General Electric Company was ready to announce two new designs in the small-motor field. One was a polyphase induction motor, for 40 deg. continuous duty, made in sizes from ¼ to 15 hp.; the other a single-phase motor, constant speed, for 40 deg. continuous duty, and made in sizes from ¼ to 10 hp.

The problem confronting the General Electric sales department in San Francisco was how to get their story across to the consuming public on a wholesale basis in order to cover the field as completely as possible, and bring about a consumer demand in the interest of their jobbers and retail distributors.

Perhaps the largest field for motors of this type is in various agricultural applications, so after a great deal of study Frank E. Boyd, assistant sales manager in charge of the motors and merchandise department, devised a plan which was placed into effect with most satisfactory results. In a few words, the plan involved holding a series of so-called motor meetings at various points in the section of California north of the Tehachapi.

The responsibility for securing an attendance at each meeting devolved upon the salesman for the company at each point where the meetings were held. The same program was followed at each meeting so that a description of one will be equally applicable to any of the others.

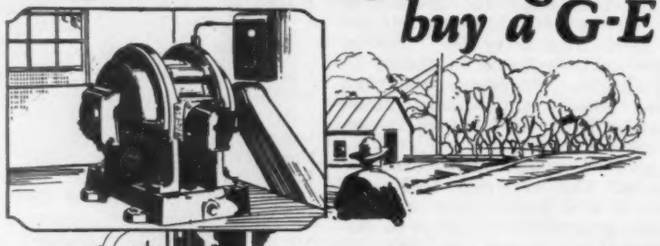
At the Sacramento meeting the assembly hall of the Pacific Gas and Electric Company was secured for the occasion. The meeting was called to order at 8 o'clock by W. J. Delehanty, local salesman for the company, who introduced E. O. Shreve, manager for the company in San Francisco. Mr. Shreve gave a brief talk on the General Electric Company, its methods, principles of operation and ideals. He spoke particularly on the work done in the General Electric Company research laboratories through which new ideas and designs were developed and tested before being placed upon the market.

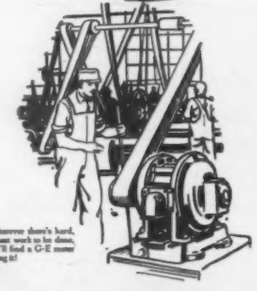
Mr. Shreve was followed by Mr. Boyd, who made the principal talk of the evening. Mr. Boyd with the assistance of lantern slides went into great detail as to the design, characteristics and performance of each of the new motors which were being offered. Mr. Boyd's talk was especially well received, the audience showing its genuine interest in the subject by the close attention that was paid.

O. A. Schlesinger of the Western Electric Company followed Mr. Boyd and spoke as a distributor for the General Electric Company motors in question. Mr. Schlesinger was followed by M. Rhine, assistant sales manager in charge of industrial and marine sales, who spoke briefly upon the developments made by the General Electric Company in the field of marine propulsion.

The total time consumed was about two and one-half hours, namely, from 8 p.m. to 10:30 p.m. It was especially interesting to note the attendance, which in this case was one hundred and thirty-five men coming from a radius in some cases of forty or fifty miles, thus showing their intelligent interest

Accept no other as "Just as good"— buy a G-E





Wherever there's hard, honest work to be done, you'll find a G-E motor doing it!

YOU expect adequate return in service from your motors. Then select the motor that is sure to give that service!

Investigate the new G-E Three-Phase motor before making your next power purchase for shop, factory or farm. This motor is built for hard, continuous service. The vital parts are protected from dirt, grease, water and alkali dust. Windings, instead of being exposed, are embedded in a solid insulating compound. Bearings are steel shell, hard babbitt lined. Rotor winding is cast in one piece, eliminating joints and connections.

This motor is designed according to the same exacting manufacturing standards and the same advanced engineering principles applied to the G-E generating and transmission equipment used in the great power developments of California.

See your nearest G-E motor dealer listed below. He will go over your power requirements and specify the right motor for your job.

Complete motor stocks are maintained in San Francisco, supported by a staff of experts continually at your service.

GENERAL ELECTRIC

FOR FULL INFORMATION GO TO ANY OF THESE G-E DEALERS

Bell Electric Co., Auburn
Bird Electric Co., Chico
Byron Jackson Pump Mfg. Co., San Francisco
Calif. Hydraulic Eng. & Sup. Co., San Francisco
W. R. Camp, Sacramento
Capitol Electric Co., Sacramento
Frank Carr, Ryde
Conger's Electric Shop, Woodland
Crane Company, Sacramento
Dahlmeier's, Oroville
Harry E. Dochar, Calistoga
Duncan's Hardware Store, Red Bluff
Farm Engineering Service, Florin
Geo. C. Foss, Sacramento
Gridley Electric Co., Gridley
A. R. Hancock, Willows
Hancock's Electric Store, Oroville
L. C. Kimball, Elk Grove
Benj. F. King, Dixon
Krogh Pump & Mchy. Co., San Francisco
G. C. Kuechler, Sacramento
Layne & Bowler Corp., San Francisco
Leppen & Hawley, Sacramento
McCarley Smith Mercantile Co., Cottonwood
Puccinelli Dehydrator Co., Los Gatos
Roberts Engineering & Constr. Co., Marysville
Simonds Machinery Co., San Francisco
Solano Supply & Construction Co., Suisun
Sterling Electrical Co., Sacramento
Taylor's Foundry & Engineering Co., Grass Valley
Vacaville Water & Power Co., Vacaville
Vallejo Electric Light & Power Co., Vallejo
Valley Construction Co., Sacramento
Weider's Electric Works, Woodland
Williams Hardware Co., Williams
Woodin & Little, San Francisco
Yuba Mfg. Co., Marysville

Facsimile of one of the advertisements used in the campaign that introduced the new motors.

and desire for further enlightenment as to the progress that had been made in motor development.

In all there were thirteen meetings held, as follows:

Date	Place	Attendance	G. E. Salesman in Charge	Speaker
Jan. 17	San Francisco	140	F. O. Sievers	F. E. Boyd M. Rhine
Jan. 22	Oakland	135	G. L. Beaver	R. M. Alvord F. E. Boyd M. Rhine
Jan. 24	San Jose	102	C. A. Binns	R. M. Alvord F. E. Boyd
Jan. 29	Stockton	80	S. G. Gearhart	F. E. Boyd E. O. Shreve
Feb. 1	Modesto	81	S. G. Gearhart	F. E. Boyd A. V. Thompson
Feb. 5	Fresno	104	W. C. North	R. M. Alvord F. E. Boyd A. V. Thompson
Feb. 7	Visalia	91	W. Eckley	R. M. Alvord F. E. Boyd
Feb. 8	Bakersfield	85	C. F. Forsberg	F. E. Boyd M. Rhine
Feb. 19	Chico	71	J. R. Himmelsbach	F. E. Boyd M. Rhine
Feb. 26	Sacramento	135	W. J. Delehanty	F. E. Boyd M. C. Hixson John Hood M. Rhine E. O. Shreve A. C. Thompson
Feb. 28	Santa Rosa	95	J. M. Dodds	F. E. Boyd A. V. Thompson
Mar. 4	Marysville	76	W. J. Delehanty	F. E. Boyd M. Rhine
Mar. 14	Eureka	56	J. M. Dodds	C. M. LeCont M. Rhine
	13 Meetings	1,251	Total Attendance	

Since the motor-meeting phase of the sales campaign was completed, a series of advertisements has been prepared by Evans & Barnhill of San Francisco for insertion in certain country newspapers. A facsimile of one of the advertisements is reproduced herewith in order to show how closely the advertising campaign ties in with the motor-meeting phase and also how the names of the local General Electric dealers are made a part of the newspaper publicity. So that the dealers might participate to the fullest degree in the benefits derived from the campaign, a portfolio of the complete advertising was given to each in advance of the publication date.

During the course of the motor-meetings part of the sales campaign, the General Electric Company officials, actively in charge, became really a sort of flying squadron. They were traveling from one town to another holding two or three meetings per week in some cases until they felt that the ground had been thoroughly covered so far as that particular type of publicity was concerned.

The whole story constitutes an interesting example of how a relatively high-priced apparatus can be sold not merely to individuals but to groups of individuals even of an entire geographical section of many thousands of square miles in extent, at comparatively low cost and with most satisfactory results to both manufacturer and distributors.

Handling Appliance Repair Work Systematically

Individual Box for Each Job Used by Modesto, Calif., Concern to Avoid Loss of Parts and Expedite Service

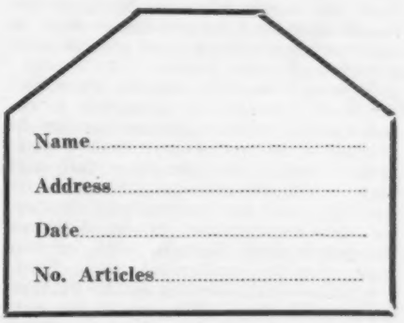
Repairing and reconditioning of electrical appliances has come to be an item of considerable importance to the electrical contractor-dealer. This minor repairing has attained such importance that managers of electrical establishments have devoted considerable attention to the best means of attending to the work. Competent workmen have been employed to do the necessary work and the actual repairing has been found to be the simplest item in connection with the transaction.

One of the principal difficulties that has developed is the keeping of the the parts, to be repaired, in such a way that any clerk in the store can readily find them when the customer calls for them. In general it has been found that tags attached to the article are not sufficient means of identifying the parts that have been left for repairing. Tags may be removed in the workshop and as a result the appliance may be returned to the salesroom without any identifying mark. In addition to this, customers may bring in appliances in a disassembled condition with the result that each part must be tagged separately or the separate parts must be tied together. Either of these practices naturally takes up time and the possibility of error is not entirely eliminated.

No little amount of inconvenience has also been brought about by the fact that appliances have been left around either the salesroom or workshop awaiting repairing and delivery. In many cases the appliances have been lost or have been misplaced so that clerks have wasted a large amount of their own and the customer's time in endeavoring to locate them. The customer naturally draws the conclusion that the store is not run on a businesslike basis and doubts whether or not the concern is adequately equipped to do the repairing. Appliances in need of repair, placed at random about the salesroom, tend to detract frim the display value of the rest of the interior and leave an impression of disorder in the mind of the customer.

A. O. Sullivan of the Sullivan Electric Company of Modesto, Calif., has recently installed a system in his store which has been found to be most satisfactory in the handling of appliances brought in for repairing. The principal factors in Mr. Sullivan's system are a number of wooden boxes, designed to hold appliances brought in for repairs. The boxes are large enough to hold any of the smaller appliances and are of the same size so that they may be interchanged in the stand devised for holding them. Each box is fitted with a brass finished card container which permits the person taking the order for repairs to place a card on the front of the box, stating to whom the appliance belongs.

To enable employees of the company to quickly make out cards that will identify the repair parts, Mr. Sullivan has prepared a special card that just fits in the container on the front of the repair box. This card has spaces for the customer's name, address, the date and the number of articles brought in for repairing. In filling out the card, the clerk writes the last name of the customer first in order that the box that contains the parts may be placed in its proper place in the stand. This stand, for holding the boxes, is so designed that the boxes are kept in alphabetical order according to the last name of the person owning the appliance. As the device to be repaired is received, all of the parts are placed in the box which is then placed in the compartment corresponding to the initial of the last name. This compartment is located just behind the counter and presents an attractive and orderly appearance.



The card, reproduced above, is made out by the clerk and is placed in a brass holder on the front of the repair box. The box is always kept in alphabetical order with other boxes containing repair work.

When the box containing the appliance to be repaired is removed from the stand in the salesroom, it is taken to the repair department and is placed in a similar compartment arranged in the same way. The workman at the repair bench takes the work according to the date it was received and keeps only one box on his bench at a time. In this way all loose parts are kept together and there is no need to tag each individual part.

After the necessary repairs have been made the box is returned to the salesroom and is placed in the proper compartment. Any clerk in the store can immediately determine whether any particular job has been done by looking in the proper compartment. The result is that customers are not kept waiting and counters are not cluttered up with numerous appliances.

INDUSTRIAL NEWS

Power Bond Issue for $21,000,000 Defeated in Los Angeles

Unofficial returns on the $21,000,000 bond issue for the Los Angeles Bureau of Power and Light indicate that the measure was rejected by the voters of the city in the election of May 6, by a narrow margin. The final count showed that the measure failed to receive the necessary two-thirds vote by 2,430, the returns being 104,224 for the bonds and 55,757 against the issue. The funds which the Bureau expected to derive from the bonds were to be used for financing extensions and betterments to the municipal distribution system over a period of three years.

Reports from Los Angeles state that the Power Bureau is preparing to resubmit the measure at an election in August by means of an initiative petition. Should this procedure fail, and there is considerable question as to its legality under the present city charter, the bond issue cannot be placed before the public until Nov. 6, 1924, or two days after the general election. Thus, it is pointed out, the city will be without funds until May, 1925, when the city primaries take place, unless a special election is called. It is estimated that such a special election would cost approximately $100,000 and it is doubtful if the city council could be induced to call one for the purpose of voting bonds for the Power Bureau alone.

It is also reported that the Bureau will seek to have special legislation passed which will reduce the number of votes necessary to pass bond issues for revenue-producing utilities to a majority vote instead of a two-thirds vote as at present. It is pointed out that this may be a possible means of getting out of the present difficult situation.

This is the second consecutive attempt of the Power Bureau to obtain funds for extensions and betterments which has been defeated. A $35,000,000 bond issue which included $25,000,000 for starting development on the Colorado River failed to carry by a wide margin last June. The Bureau has had no money available from bond issues for three years and at one time last year was reputed to be in such financial straits that it was forced to borrow a large sum from the general tax fund of the city.

On the ballot which carried the power bonds were other bond issues totaling $46,900,000, all of which were passed with substantial margins. The same condition held in 1923 when the power bonds were the only issue on the ballot to be defeated.

The largest issue to pass in the May election was the county flood control bonds which appropriated $35,300,000 to be used in the construction of dams, reservoirs and waterways necessary to harness the flood waters of the San Gabriel and San Fernando valleys.

The "straw vote" conducted on the proposition as to whether or not the city should participate in the development of Boulder Canyon dam on the Colorado River was overwhelmingly in favor of such procedure. The vote, however, has no legal status and involves no expenditure.

A.E.C. Urges Committee Report on Muscle Shoals Project

No disposition should be made of Muscle Shoals until a thorough investigation has been made by a joint committee of Congress, it is asserted by the American Engineering Council in a report submitted to George W. Norris, chairman of the Senate Committee on Agriculture and Forestry. The engineers find that the expectation of cheaper fertilizers immediately is unwarranted, and that the synthetic process of nitrogen fixation has altered the whole situation. Exhaustive inquiry by an impartial technical commission is urged, the Engineering Council offering its assistance in this task.

The engineering report, prepared by a special committee sitting in Washington, in response to a request by Senator Norris, was made public by the president of the Council, Ex-Governor James Hartness of Vermont. The report states that any disposition of the power plant should have as its base provisions that are in substantial accord with the Federal Water Power Act.

File Application for Mokelumne River Power Project

An application for a preliminary permit has been filed with the Federal Power Commission by Stephen E. Keiffer, of San Francisco, covering a development in the Mokelumne River in California. He plans to divert that stream into a large reservoir on Dry Creek, at a point 20 miles northeast of Lodi. He plans to develop 20,000 hp. and in addition will use water for irrigation purposes in the Sacramento Valley.

This project is in conflict with an application previously filed by the Construction Company of North America, of San Francisco.

Large Direct Current Generator Installed in Portland.—Installation of the largest direct current generator on the Pacific Coast has recently been made by the Northwestern Electric Company of Portland, Ore. The new unit is a 2,500-kw. motor generator designed to furnish direct current for the underground system serving the business section of the city.

Paper Company Asks for Seattle Electric Power Contract

The Puget Sound Pulp & Paper Company has presented to the City of Seattle a proposed power contract, by which the city is to furnish the company 26,000 kw. at a flat rate of $33,426 a month, to supply power for the company's proposed new $1,000,000 paper and pulp mill to be established in Seattle. The blank form contract prepared by the paper company's legal department has been referred to the finance and city utilities committee.

J. D. Ross, superintendent of lighting, approves the pending contract but admits that its acceptance by the city would make necessary either the next proposed step in the Skagit development or the enlargement of the Cedar Falls plant. Mr. Ross has approved the rates suggested, and will make a complete report to the city council committee, containing suggestions as to plans.

Mr. Ross' plans for enlarging the Cedar Falls plant contemplate increasing the storage in Cedar Lake by building a higher dam at the site of the present crib dam, and then constructing a tunnel that would tap the bottom of Cedar Lake and lead to the Cedar Falls power plant. He estimates the cost at $1,750,000 and that the output of the plant would be increased to 25,000 kw. the year around.

Philip Tindall, city councilman, opposes the proposed power contract with the paper company, alleging that it will definitely commit the city to an additional investment of $15,000,000 to $20,000,000 at Skagit, and contending that the proposed enlargement of the Cedar Falls plant would not provide the required power. He also attacks the proposed rate, claiming that it figures about $15.60 per kw. year for primary power, which he claims is about half the cost of production including maintenance and operation charges, depreciation, interest and redemption allowances. He also charges that the ordinance as drawn would permit the pulp company to sublet its contract.

Fifty Per Cent of Signatures for Water and Power Initiative Measure Secured.—The California State Water and Power Act Committee has filed with Harry Zemansky, registrar of voters, San Francisco County, a petition bearing 38,000 signatures to place the Water and Power Act on the November, 1924, California state ballot. The petition contains more than half of the 73,000 signatures necessary for the entire state to insure the measure being placed before the people at the election. Petitions are also being circulated in other California cities, including Los Angeles, Sacramento, Stockton, San Diego and Oakland.

Suit Filed to Prevent Evaluation of L.A. Gas & Electric

Suits have been filed in the superior courts of Los Angeles County by the Los Angeles Gas & Electric Corporation to enjoin the city from spending the $50,000 appropriated in two ordinances passed at the May 6, 1924 election for the purpose of evaluating the properties of the privately owned utility. Two ordinances passed by the city council appropriating $5,000 for work already done by the Railroad Commission and $45,000 for completing the evaluation were placed on the ballot by referendum. Both carried in the last election.

The suits instituted by the company hold that the ordinances are illegal. The city will not be able to proceed with the evaluation until the suits are settled unless the Railroad Commission is willing to proceed with the work and take its chance of receiving remuneration at some later date.

Since the acquisition of the distribution lines of the Southern California Edison Company, the Bureau of Power and Light has been agitating the taking over of the electric properties of the Los Angeles Gas & Electric Corporation. Were this done, the Bureau would then have an absolute monopoly of the distribution of electric energy within the city limits.

The attempt of the Bureau to secure an appraisal of the properties of the company has been the subject of court litigation since the movement started.

Municipal Ownership Question Up in Two Colorado Cities

Municipal ownership and operation of electric light plants in two Colorado cities is to be decided shortly for, according to latest reports, only one barrier remains in the situation both at Loveland and Colorado Springs.

The recent decision of Judge J. Foster Symes in the United States district court at Denver denying the petition of the Franklin Trust Company of New York, representing a bondholders' protective committee of the old Western Light & Power Company, leaves the Loveland situation only dependent on the final report to be issued by the state public utilities commission. The city council, however, is said not to regard the opinion of such a regulatory group because of the powers granted in the home rule charter of that community. As a consequence, orders have been given to proceed with the preliminary work of building the new hydro plant, the contract for which is held by the Hendrie & Bolthoff Manufacturing & Supply Company of Denver.

The fight in Colorado Springs is at the boiling point. Utility men in the mountain region are watching the situation closely in its final development before the election on May 20. Both sides of the issue are questioning not only the sincerity but also the veracity of the opposition. This is reflected in the volume of newspaper advertising appearing daily relative to the issue.

Inasmuch as the fight does not include any franchise consideration for a private company, the outcome of the election will determine whether or not any further privileges will be extended to the Colorado Springs Light, Heat & Power Company or any other utility operating organization, provided the taxpayers do not pass the bond issue.

With the recent announcement that A. E. Carlton, Colorado Springs capitalist, was considering the construction of an electric generating plant at the Golden Cycle ore reduction mill, proponents of municipal ownership look upon it favorably because the mill is at present the largest customer of the present plant and the load would have to be taken over by the city plant if the bond issue carries, but with the establishment of its own isolated plant, the maximum generating capacity figured by the city in its plans could be materially reduced and this likewise would slice over $200,000 off the necessary bond appropriation.

Opponents of municipal ownership interpret the movement with equal favor because they say that if the Golden Cycle load is not provided the city operated plant the consequent loss of the largest single power consumer will be reflected in increased rates to private customers. They also point out that the claim of the proponents claiming favoritism to the mill in power rates could be disproved if the Carlton interests proceeded in the construction and operation of their own plant.

Hydro Developments on Skagit Tributaries Proposed

Development of hydroelectric plants with a combined capacity of 3,750 hp. at an estimated cost of $145,000 is proposed in three applications filed at Olympia, Wash., with Marvin Chase, state supervisor of hydraulics, by Allen R. Moore, of Mt. Vernon, for water rights on Pressentin, O'Toole and Cumberland Creeks, all tributaries of the Skagit River.

The Pressentin Creek application calls for 40 sec.-ft. of water, the construction of a pipe line 1½ miles long and a dam 30 ft. high, 120 ft. long on top and 12 ft. long on the bottom. The water will be used at a 1,000-ft. head and develop 2,000 hp. at an estimated cost of $75,000.

The O'Toole Creek plant will use 15 sec.-ft. of water at a 1,000-ft. head, developing 750 hp. The development will involve construction of a dam 45 ft. high, 120 ft. long on top and 36 ft. long on the bottom, and a pipe line one mile long, the cost being estimated at $30,000.

The Cumberland Creek plant will cost $40,000 and develop about 1,000 hp., using 20 sec.-ft. of water at a 1,000-ft. head. The dam will be 50 ft. high, 200 ft. long on top and 22 ft. long on the bottom. The pipe line is to be one mile long.

Flood Prevention Crews to Work by Electric Light.—In order to carry on flood prevention work near Pueblo, Colo., on a night and day schedule, one of the companies engaged in the contract of moving the railroad yards and placing a new river channel where the railroad yards now are, has arranged with the Southern Colorado Power Company to light the area of operations for more than two miles of length and 2,000 ft. in width. Six 2,000-cp. New Giant Duplex projectors will be used.

Bend, Ore., Considers New Street Lights.—At a recent meeting of the city council of Bend, Ore., a 100-light system of ornamental "white way" lighting was considered. This would provide for the illumination of several blocks in the center of town.

Colorado Power Co. Is Acquired by Doherty Interests

Control of the Colorado Power Company has recently been acquired by the Cities Service Company of New York, N. Y. Announcement of the purchase of the majority of the common stock of the Colorado Power Company was made by Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, upon receipt of the news from Henry L. Doherty, president of the Cities Service Company.

By the purchase of the majority of the common stock of the Colorado Power Company, the Doherty interests come into control of the $18,000,000 power and light plant of the Colorado company on the Grand River near Glenwood Springs, Colo. This plant supplies light and power to Sterling, a neighboring town in eastern Colorado, and to Salida, Glenwood Springs, Alamosa, Cripple Creek and Leadville. The systems of the Public Service Company of Colorado and of the Colorado Power Company have been connected for some time and the latter company has been selling current to the Denver utility.

A statement issued from the office of the Public Service Company of Colorado states that "acquisition of the property of the Colorado Power Company places the Public Service company in a very strong position. The territory now served by the Public Service company extends practically from Glenwood Springs on the west, Cheyenne on the north, Sterling on the east, and Alamosa and Salida on the south."

No radical changes in the personnel of the Colorado Power Company are contemplated as the result of the purchase of the control of the company by the Doherty interests, and it is understood that Norman Read of Denver will continue as vice-president and general manager. According to Mr. Doherty's telegram advising Mr. Stannard of the purchase of the Colorado company, representatives of the Public Service Company of Colorado and Henry L. Doherty & Company will occupy positions on the board of directors of the Colorado Power Company that will be vacated as a result of the purchase.

In his telegram, Mr. Doherty stated that the financing of the purchase of the Colorado company would be through the public offering of six per cent notes of the Public Service Company of Colorado in the principal amount of $3,000,000 to provide funds for the payment of the common stock of the Colorado Power Company. It is understood that the notes will be sold to the public at par and accrued interest and that the arrangement is only for a short time as the Public Service Company of Colorado plans to sell to consumers a substantial amount of its preferred stock over the next twelve months.

Rates Reduced in Washington Cities.—The Pacific Power & Light Company has announced a 20 per cent reduction in commercial lighting rates, and a slight cut in residential rates in Yakima, Wash., and the adjacent territory served by the company. The company has also announced reductions in commercial and lighting rates in Walla Walla, which company officials claim will cut the gross revenues $100,000 a year. New rates became effective on May 1.

Present Report on Developed and Potential Power

Geological Survey Announces Findings Concerning Hydroelectric Installations and Possibilities in United States

The Geological Survey, Department of the Interior, has just brought up to date its record of developed water power in the United States, which shows that there are now about 3,200 water-power plants of 100 hp. or more, having a total capacity of installed water wheels of 9,086,958 hp., an increase of about 1,160,000 hp., or nearly 15 per cent over the total in 1921, which was 7 926,958 hp. Of the present total 81 per cent is in public utility plants and 19 per cent in manufacturing plants. The corresponding percentages in 1921 were 78 and 22.

New York, with 1,542,983 hp., is still the leading state in developed water power; California, with 1,451,830 hp., is a close second; Washington, with 480,356 hp., is third; Maine, with 473,188 hp., is fourth; and North Carolina, with 431,500 hp., is fifth, displacing Montana, which ranked fifth in 1921.

Water-power development in the New England, East North Central, West North Central, and Mountain States has not kept pace with that in the other parts of the United States, as the following table shows.

Developed Water Power in Specified Divisions of the United States in 1921 and 1924.

Division	Percentage of total in U. S.		Difference
	1921	1924	+ = increase — = decrease
New England	16.5	15.3	—1.2
Middle Atlantic	18.7	19.1	+ .4
East North Central	9.3	9.1	— .2
West North Central	5.6	5.1	— .5
South Atlantic	13.6	14.3	+ .7
East South Central	3.1	3.8	+ .7
West South Central	.2	.2	0
Mountain	10.4	9.7	— .7
Pacific	22.6	23.5	+ .9

The Pacific and Mountain States have in 515 plants with over 100 hp. capacity hydroelectric installations that total 3,019,834 hp. These installations are divided as follows:

Division and State	Total		Public utility and municipal		Manufacturing and miscellaneous	
	Number of plants	Capacity in horsepower	Number of plants	Capacity in horsepower	Number of plants	Capacity in horsepower
Mountain						
Montana	29	345,040	27	343,100	2	1,940
Idaho	46	270,918	42	269,021	4	1,897
Wyoming	10	7,886	9	7,560	1	326
Colorado	52	87,978	28	77,880	24	10,098
New Mexico	5	1,322	5	1,322	0	0
Arizona	8	38,760	8	38,760	0	0
Utah	66	115,329	51	110,344	15	4,985
Nevada	10	13,550	8	12,950	2	600
Pacific						
Washington	70	480,356	63	469,139	7	11,217
Oregon	74	206,865	52	147,620	22	59,245
California	145	1,451,830	118	1,432,748	27	19,082

A new estimate has been made of the potential water power resources of the United States including Alaska, Porto Rico, and Hawaii which it is physically feasible to develop under present conditions. Absence of market for power and inability to obtain necessary legal rights will delay development but should not prevent it. The figures given in the estimate show the 24-hour power available 90 per cent of the time and 50 per cent of the time at 70 per cent overall efficiency at both developed and undeveloped sites.

The estimate of the water-power resources of the United States is based on reports prepared by bureaus of the federal government, by states, by corporations, and by private engineers. In districts for which no water-power reports are available the data used are taken from the estimate of the potential water-power of the United States prepared by the Geological Survey in 1908. In many of the reports from which the data were taken the estimates of potential power include the use of stored water for generating power. For districts where reservoirs are already built or where detailed field examinations show that such storage is feasible, these estimates have been used. All plans filed with the Federal Power Commission by applicants for permits to develop power on Colorado River show that power development on this river will include the use of stored water. This estimate therefore assumes that stored water will be used to equalize as far as possible the flow of Colorado River below the mouth of Green River. The estimate includes half of the potential power of Niagara River and of the international section of St. Lawrence River, though an international agreement is necessary to permit the full use of these resources.

The estimate of the potential water power of the United States prepared by the Geological Survey in 1908 was based on the primary factors of slope and discharge. Very flat sections of rivers were not considered, but all other known potential water power of the United States was included, without regard to the practicability of development.

The present estimate is based largely on reports that include only feasible sites and it therefore represents the potential power that can be developed when a market is available, yet it does not differ very materially from the estimate made in 1908. Allowing for the difference in assumed efficiency and for the inclusion in this estimate of the United States share of the potential power on Niagara and St. Lawrence Rivers, the present estimate of the potential power available 90 per cent of the time is about 21 per cent higher than the estimate of 1908 mainly because of the assumed use of stored water at places where detailed examinations and surveys have shown the existence of good reservoir sites. For the same reason the estimate of power available 50 per cent of the time is 4 per cent higher.

This estimate cannot be considered final in all respects. Surveys and detailed studies are necessary to determine the most economical method of development, and these studies will probably lead to changes in the estimates of potential power in individual states. Additional data are especially desirable for some of the South Atlantic States. Future studies will probably be concerned principally with the use of stored water. These studies may result in a considerable increase in the estimate of the potential power available 90 per cent of the time but will probably affect to a much less extent the estimate of potential power available 50 per cent of the time. The estimates made in 1908 of total potential power without storage have been compared with recent estimates made for several states where reliable data show the power that can be economically developed, including that available by the use of stored water. As this comparison shows no radical difference in total results future studies will probably make no great change in the present estimate of the potential water power of the entire country.

Washington stands first among the states in potential water power, for power available both 50 per cent of the time and 90 per cent of the time. The state is closely pressed, however, by Oregon, California, and New York. A large proportion of the potential power in New York is available continuously due to the equalization of the flow of Niagara and St. Lawrence Rivers. The same is true of Arizona, whose water-power resources are mainly on Colorado River, where the flow can be controlled.

The estimate of the potential water power of Alaska, which is believed to be conservative, is based on a report covering southeastern Alaska and on a general knowledge of the conditions in the remainder of the territory.

In regard to the relation of present development to future possibilities, the Geological Survey reports:

"The percentage of the total potential power of the United States that has already been developed can be estimated only in a rough way.

"The capacity of water wheels at developed sites in Maine, New Hampshire, Vermont, and Massachusetts amounts to 131 per cent of the power available 50 per cent of the time at those sites. The wheel capacity in Massachusetts is nearly double the potential power for 50 per cent of the time at 70 per cent efficiency. A considerable percentage of the water power developed in these four states is used in industries where the power is required only 8 to 12 hours each day, with pondage at the power plant sufficient to store the stream flow at ordinary stages when the plant is not operating. This condition results in a large overdevelopment of equipment in many plants. The developed sites in Canada from coast to coast have an average wheel installation 30 per cent greater than the power available during the six months of greatest flow. It will be many years before all the water-power sites in the United States are developed to a greater extent than the sites that have been utilized in the four New England states. Assuming that all sites may eventually be devel-

oped to a point where the wheel capacity is 131 per cent of the power available 50 per cent of the time, we may say that the installed capacity will reach 72,000,000 hp. The present installed capacity of plants of 100 hp. or more is 9,087,000 hp., and on the above assumption of the ultimate installed capacity, about 12.5 per cent of the potential water power of the country has now been developed."

Classification of the potential water-power resources of the United States by territorial divisions and by states for the Mountain and Pacific States is given below.

State and division	Available 90 per cent of the time		Available 50 per cent of the time	
	Horsepower	Per cent	Horsepower	Per cent
United States	34,818,000	100.00	55,030,000	100.00
New England	998,000	2.87	1,978,000	3.60
Middle Atlantic	4,317,000	12.40	5,688,000	10.35
East North Central	737,000	2.12	1,391,000	2.53
West North Central	871,000	2.50	1,844,000	3.35
South Atlantic	2,476,000	7.11	4,464,000	8.11
East South Central	1,011,000	2.90	2,004,000	3.64
West South Central	434,000	1.25	888,000	1.61
Mountain	10,736,000	30.83	15,513,000	28.19
Pacific	13,238,000	38.02	21,260,000	38.63
Mountain				
Montana	2,550,000	7.32	3,700,000	6.72
Idaho	2,122,000	6.10	4,032,000	7.33
Wyoming	704,000	2.02	1,182,000	2.15
Colorado	765,000	2.20	1,570,000	2.85
New Mexico	116,000	.33	186,000	.34
Arizona	2,759,000	7.92	2,887,000	5.25
Utah	1,420,000	4.08	1,586,000	2.88
Nevada	300,000	.86	370,000	.67
Pacific				
Washington	4,970,000	14.27	7,871,000	14.30
Oregon	3,665,000	10.53	6,715,000	12.20
California	4,603,000	13.22	6,674,000	12.13

Great Western Is to Build New Substation in Oakland

Application was made by the Great Western Power Company of California, on May 12, for permits to build in Oakland, Calif., a new combination substation and steam heat plant on property recently purchased by the company on Twentieth Street, near Telegraph Avenue. Construction will begin at once and the building will be completed early next year, it is expected. The cost, including installations to tie in the system, will be approximately $425,000. This is the main item of construction work in the Oakland division of the Great Western, which will total about one million dollars during 1924.

The new plant will be a two-story building with a frontage on Twentieth Street of 65 ft. and a length of 135 ft. It will have a total floor area of 12,212 sq. ft., of which the electric substation will utilize 9,212 ft. The structure will be built of reinforced concrete, with an ornamental front and a massive doorway. Construction work will be done by the Great Western Power Company. Contracts will be let immediately for the steel.

In the new plant, direct current will be generated for operation of elevators in the downtown office buildings and for miscellaneous purposes, and electric energy will be transformed for distribution in the underground district. This station will have a transformer capacity of about 11,250 kw.

Permit on Kings River Sought by Irrigation District.—The Fresno Irrigation District has applied to the Federal Power Commission for a preliminary permit covering a power project on the Middle and South Forks of Kings River. The project is almost identical with that for which application was made by the City of Los Angeles. That application was rejected last year by the Commission when the city failed to give assurances for the prompt development of the project. Evidence to that effect will be required of the Fresno interests before the Commission entertains the application.

Contract for Cushman Project Equipment Is Signed

The Tacoma, Wash., city light department has signed a contract with Allis-Chalmers Manufacturing Company for furnishing and installing machinery equipment of the first unit of the Cushman power project. The contract price was $630,780 for the turbines, generators, condensers, transformers, and minor equipment, and $4,950 for installation. The time limits set for delivery of the machinery are so favorable that the completion of the power house is promised for at least a month before the schedule originally figured on by J. L. Stannard, chief engineer. The new contract signed brings the Cushman project now approximately $540,000 below the estimate of the city's engineers. Contract for the cement required has been awarded to C. S. Barlow & Sons of Tacoma, on a bid of $3 per barrel.

Work on the diversion dam at the Cushman power site will mark the next step in the $4,000,000 project, according to Ira S. Davisson, commissioner of light and water. The dam will be constructed above the permanent damsite and will be used to divert the water while the latter is constructed. The water will be turned into a tunnel that will carry it below the power house, which will be constructed along with the dam. The tunnel will later be utilized for carrying water into the power house.

Pueblo Steel Mills to Be Electrified.—Spending $3,000,000 to electrify the steel mills at Pueblo, Colo., in the next two years is the program of the Colorado Fuel & Iron Company of Pueblo. A new power house will be built to furnish some of the current needed to change the plant from steam driven to electric while some of the power will be furnished by the Southern Colorado Power Company. The steel plant recently equipped two of its blast furnaces with electric precipitators, and will equip all of the furnaces with them before the two-year improvement program is completed.

California Oregon to Rush Work on Copco No. 2 Plant

Approval of the California Railroad Commission of an agreement between The California Oregon Power Company and the Pacific Gas and Electric Company for the construction of Copco No. 2 hydroelectric plant on the Klamath River, Siskiyou County, Calif., a transmission line from the plant to Delta, Calif., and for the sale of the output of this plant to the Pacific Gas and Electric Company, has been requested by The California Oregon Power Company. The plant would duplicate the Copco No. 1 plant and would be located about a mile down stream from the present hydroelectric installation.

Plans call for the installation of one 25,000-kw. generator with hydraulic turbine. It is the intention to complete the plant by April 1, 1925.

At the time of requesting the Railroad Commission's approval of the agreement, The California Oregon Power Company asked authority to issue and sell $2,500,000 of series "B" bonds, $1,500,000 of 7 per cent twenty-year sinking fund debentures, and $1,000,000 of preferred stock. The proceeds from these issues would be used in the proposed improvement.

Construction on Steam Plant at Longview Progressing

Rapid progress is being shown on the construction of the steam electric power plant of the Long-Bell Lumber Company at Longview, Wash. The main power house is of reinforced concrete 310 ft. long, 192 ft. wide and 86 ft. high and will eventually contain six 6,000-kw. turbo-generators as main units. Three of these units are now being installed.

A conspicuous feature of the plant is the erection of two huge concrete stacks 300 ft. in height and sloping from an internal diameter at the ground level of 26½ ft. to 21 ft. at the top. The stacks will carry a huge Long-Bell trade mark which will be electrically lighted at night. It is planned to start operations in July.

Test Made on New Tacoma Oil Burning Equipment.—The oil-burning equipment of the steam generating plant of the Tacoma light department was recently placed under final test by T. A. Parker, chief operator of the plant. The oil-burning equipment is the same as that installed in the power plants of the battle cruisers recently built in Tacoma, and represents an investment of $50,000. The test shows that by installing the oil-burning equipment to replace the original hog fuel burners, the two boilers in the plant, formerly rated at 4,400 hp., have been raised nearly 300 per cent in efficiency, and can furnish steam to produce 12,000 hp.

Range Campaign Being Conducted in Colorado City.—A Westinghouse range campaign now being conducted by the Arapahoe Light & Power Company was launched at Littleton, Colo., April 23, with a lecture, demonstration, and free luncheon to which all the housewives of the community were invited. Mrs. Margaret Gaffrey, a factory demonstrator, conducted the demonstration. The affair was arranged by Thomas McGrath, local manager of the company.

Downstream slope of new Butt Valley hydraulic fill dam of the Great Western Power Company.

Butt Valley Dam Completed for Great Western Company

The main section and spillway of the Butt Valley Dam of the Great Western Power Company in Plumas County, Calif., was completed April 30 by the Schultz Construction Company. The dam, which is of the hydraulic fill type, increases the storage in Butt Valley from 5,000 to 50,000 acre-feet. The new dam replaces a smaller one formerly located at the same point. The work just completed is the second project finished by the company this year, designed to secure additional power from the Plumas County development. The installation of the third unit in the Caribou plant of the company, adding 32,000 hp. to its capacity and bringing the total installation up to 96,000 hp., was the first project completed.

The dam just completed by the Great Western company is 1,200 ft. in length and contains 300,000 cu. yd. of material. Eight months were required to complete the construction work on the dam. The spillway that has been built at the dam site is designed to carry ten times the maximum recorded flow of the valley and provides ample security for the dam.

To render practically all of the water stored in Lake Almanor available for use in the Caribou plant, the company has recently let contracts for the dredging of the present 2½-mile channel in the lake leading to the mouth of the tunnel that leads to Butt Valley. At present there are several deep holes in the bed of the lake and with the channel that has been in use it has not been possible to make full use of the stored water through the tunnel leading to the Caribou plant. The excavation will be in the channel connecting the east arm of the lake with the intake of tunnel No. 1, which leads from Lake Almanor to Butt Valley.

An electrically operated ladder dredge will be used to deepen the channel in the lake. This dredge is being constructed in San Francisco and will be shipped to the lake in sections and will be assembled there. Seventy buckets, each of 2-cu.yd. capacity, will be attached to an endless chain on the dredge.

Record Span for Cushman Project Power Line Proposed

A new record span is contemplated in the plans for the construction of two 3-phase, 110-kv. transmission lines of the Cushman Power Project being built by the City of Tacoma, Wash. It is proposed that these lines skirt the south end of Hood Canal, extend northeasterly across the north ends of North Bay and Henderson Bay, and cross from Point Evans to the Tacoma side of "The Narrows," a distance of 6,153 ft. This is more than 1,100 ft. longer than the longest of four similar spans now in successful operation, namely: two crossings of Carquinez Straits, on San Francisco Bay, Calif., 4,427 ft. and 4,753 ft. long, respectively; one over the St. Lawrence River near Quebec, 4,801 ft. long; and one of 5,010 ft. over the Little Tennessee River in North Carolina.

Because of the swift tidal currents in "The Narrows," the rocky, uneven bottom and high, steep bluffs on the shore, the use of submarine cables was found impracticable; to go around to the lower end of the Sound would necessitate a greatly increased length of transmission line. Carrying the conductors over in the long span proposed was decided to be the best solution.

After thorough investigation and tests the messenger span system of supporting the electrical conductors was selected in preference to the self-supporting conductor type. Plans call for conductors of 300,000 circ.mil. copper or equivalent aluminum, supported by 1¼-in. galvanized plow steel concentric wound messenger cables passing over large sheaves in the towers and continuing downward into heavy anchorages deeply imbedded in the earth. The conductors will be supported on suspension insulators hung from the messenger cable every 400 ft. It was found that the spacing of the supporting suspension insulators on the messenger wire was an important factor in damping out vibration and that with the proper spacing, vibration could be almost entirely eliminated. This type of construction obviates the problem of insulation of a large steel cable and fatigue and failure of the span due to vibration. The St. Lawrence span is of this type and no failures have occurred. Although the cables specified are to have a strength of 195,000 lb. per sq. in. over the net steer cross-section, their safe working strength is figured at 90,500 lb. per sq. in.

There are to be six cables, comprising two separate circuits, each having its own pair of towers and anchorages, with a spacing between sufficient to allow one circuit to be cut out of service and repaired without danger from cables of the other circuit. This arrangement is expected to insure uninterrupted service, as each circuit will be capable of carrying the full load of the project indefinitely. The towers, of structural steel, are to be 150 ft. back from the brink on each side, those on the east shore to be 272 ft. high and those on the west 325 ft.

The plans are being pushed to completion in the endeavor to finish the proposed span in time to put it under test for at least a year before it goes into actual service.

The Cushman project is located about fifty miles from Tacoma on the Skokomish River. The initial development contemplates a 275-ft. concrete arch dam and a power plant of 36,000 kw. capacity. It is expected that work on the project will be commenced shortly.

Division of Universal Electric & Gas Company Property Petitioned. — The Great Western Power Company of California and the Pacific Gas and Electric Company have applied to the California State Railroad Commission for permission to divide the properties formerly owned and operated by the Universal Electric & Gas Company in the city and county of San Francisco upon an equal basis and to operate the same as parts of their respective territory. The application recites that on June 1, 1922, the Pacific Gas and Electric Company paid to the Great Western company the sum of $1,127,303.82, or one-half of the purchase price of the property, and since March 1, 1922, the Great Western Power Company has operated for their joint account the properties now to be divided equally between the two companies.

Portland Men Visit Oak Grove Project.—The Oak Grove hydroelectric project of the Portland Electric Power Company was viewed from beginning to end on April 24 by about 200 of Portland's business men. This undertaking, started nearly two years ago, is now nearing completion, although 450 men are still employed along the line. It is hoped to start operating the plant in July as the demands during the coming dry season will be more than the present hydro plants can supply.

Improvements to Be Made by Pueblo Company. — The Southern Colorado Power Company of Pueblo, Colo., which only recently completed a million-dollar power house, has announced that it will expend, in the next few months, approximately $400,000 for improvements. This company serves a territory of about 150 miles in length and will spend $100,000 in the Arkansas Valley to increase substation and transmission line capacity. The sum of $80,000 will be spent to increase the boiler capacity of the Canon City plant, and $220,000 will be spent on distribution facilities.

Lumber Company Electrifies Two New Incline Railways

Extensive areas of timber lands are being opened up for the Yosemite Lumber Company by the construction of an electrically operated incline railway, extending from a point four miles west of El Portal, Calif., to the top of the mountain. The estimated cost of the line is $500,000. By this construction, timber sufficient to last at least thirty years will be made accessible, it is estimated.

The incline starts from the main line of the Yosemite Valley Railroad about four miles west of El Portal, climbs steeply to an altitude of 8,400 ft. with a grade in some places of 83 per cent. The incline is in two legs with separate electric hoists operating on each leg. Incline No. 1 is operated by two 200-hp. motors while on Incline No. 2 one 400-hp. motor is used. Power necessary to operate the incline is being supplied by the San Joaquin Light & Power Corporation.

A 2,500-hp. steam turbo-generator has been installed at the sawmill at Merced Falls, burning waste from the mill and factory. In this way the plant will be made independent of outside power sources. The new steam boilers are completed, officially tested, and are being used while the older boiler equipment is being overhauled. The new unit will be controlled by a nine-panel switchboard. Approximately 30 per cent of the 2,500 hp. available at the plant is used in belt transmission to mill machinery. Eventually the company will use electricity throughout, according to plans.

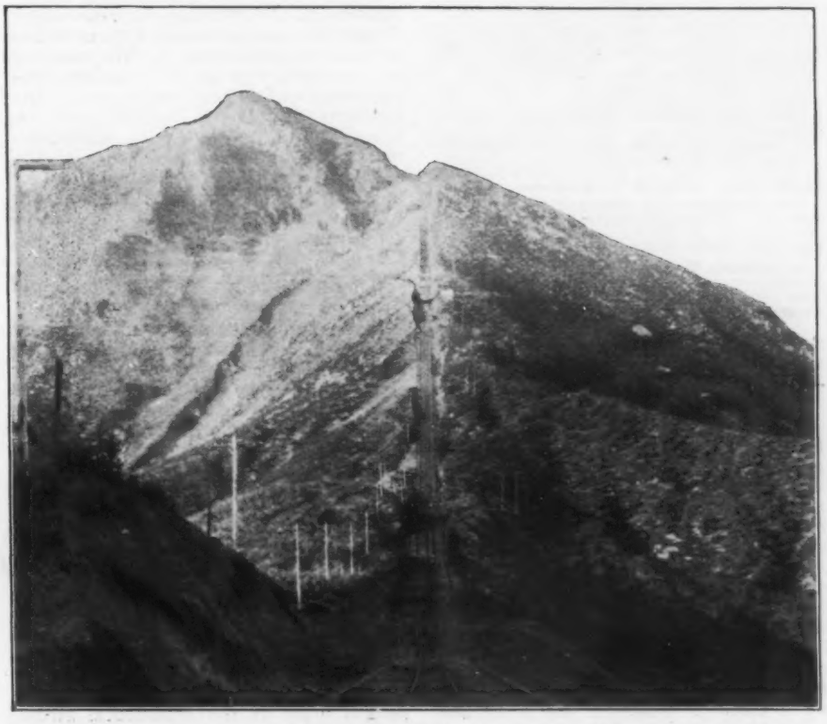
Work on the incline started last summer and has been carried on without stop since that time with a crew of 200 men. The mill at Merced Falls has also been undergoing repairs and enlargement. The mill and incline will be ready and logging operations will start in May. Five hundred men will be employed in the woods and an equal number in the mill and on the incline. The box factory and the shipping department have been busy all winter. The road, after attaining its altitude, will be extended from time to time to keep pace with logging operations.

Pit River Company Refused New Permits on Power Sites

The Pit River Power Company has been advised by the Federal Power Commission that its request for a preliminary permit covering two sites on the Pit River in California cannot be granted. The company held a preliminary permit covering substantially the same projects for three years, when it was allowed to expire. The company points out that it has acquired 8,000 acres of land and has expended a considerable sum in preparation for the development.

While one exception to the water power act has been made by special legislation authorizing a second preliminary permit, this action was taken with the express understanding that it was not to constitute a precedent. The exception was made in favor of the Dixie Power Company. It is believed that the circumstances in the case of the extension sought by the Pit River company are less compelling than those in the other instance.

Water of Sevier River System, Utah, Must Be Conserved.—Warning has been issued by R. E. Caldwell, state engineer of Utah, to the effect that the water of the Sevier River system must be carefully used in order to avoid a serious shortage. According to press dispatches, the present supply in the reservoirs is considerably less than it was at the same time last year, and the spring run-off will be light.



View looking up the track of one of the electrically operated incline railways.

1924 Construction Expenditures of Utilities Summarized

Gas and electric utilities of California during 1924 will expend $84,583,986.09 on new construction work, according to figures compiled by the Division of Finance of the California State Railroad Commission. Approximately $58,000,000 of this sum will be spent for additions and betterments to electric systems in the state.

It is impossible to present figures thus early in the year covering construction expenditures of all public utlities under the jurisdiction of the Railroad Commission, but the showing by gas and electric companies is practically complete, and has been listed by the Finance Division of the Commission as follows:

Estimated 1924 Construction Expenditures of Gas and Electric Companies in California.

Great Western Power Company of California	$ 2,652,134.67
Los Angeles Gas & Electric Corporation	13,189,110.00
Pacific Gas and Electric Company	30,592,469.42
San Diego Consolidated Gas & Electric Company	2,615,000.00
Southern California Edison Company	26,288,000.00
Southern California Gas Company	3,200,000.00
Western States Gas & Electric Company	1,317,272.00
Total,	$79,853,986.09
All other gas and electric companies	$ 5,000,000.00
Total,	$84,853,986.09

Seattle Ladies' Day Meeting Successful.—The Ladies' Day luncheon of the Electric Club of Seattle, held April 18, was one of the most successful ever held by the club.

Books and Bulletins

ALTERNATING CURRENT ARMATURE WINDING

By TERRELL CROFT, Consulting Engineer, Directing Engineer, Terrell Croft Engineering Company. 352 pages, 328 figures. Cloth, 6x9 in. $3. Published by McGraw-Hill Book Company, Inc., New York, N. Y.

A work designed for the practical man and covering the complete field of alternating current motor and generator work from the definitions of various machines and windings to simple rewinding of machines for voltage, speed, etc., for which they were originally designed, on to reconnecting of the stators for other conditions. A very comprehensive discussion is given on special and unusual connections. The chapters on testing are particularly valuable to the electrician not versed in electrical shop practice.

Division No. 6 covering standard diagrams for stator windings is a reference book in itself.

The questions following the first five divisions are reminders to the reader and give him an opportunity to examine himself on his knowledge after reading the divisions. The problems covering a division are given and the answers are given in the last five pages of the text.

Meetings

Annual Banquet Is Held by Utah Engineering Council

The annual banquet of the Engineering Council of Utah was held at the Hotel Utah at Salt Lake City on the evening of April 28, and was attended by about 250 guests. Carl E. Grunsky, of San Francisco, Calif., president of the American Society of Civil Engineers, was the principal speaker. Mr. Grunsky read a paper on "The Influence of Engineering upon Social and Economic Progress." He reviewed the historic development of engineering from the crude practices of the ancients to the present day, and pointed out some of the many obvious engineering achievements which have influenced social and economic progress, mentioning transportation facilities as one of the most important.

Mr. Grunsky also remarked on the protest entered by the engineering society to the granting of a permit of 100 years to "an individual" for the development of Muscle Shoals without Congress' first having made a thorough investigation of the situation.

In commenting upon the appointment of Dr. Elwood Mead of California, noted irrigation engineer, as commissioner of reclamation, Mr. Grunsky stated that the engineering profession of the country was vindicated for its stand in resenting the dismissal of one of its members, A. P. Davis, in favor of a "business man." "Every engineer in the country," he said, "resented the implication that an engineer is not a business man, and the appointment of Dr. Mead is a vindication of that stand. We are proud of the fact that an engineer is again at the head of the reclamation department."

R. K. Brown, president of the Engineering Council of Utah, delivered his annual report. D. C. Green, vice-president and general manager of the Utah Power & Light Company, acted as toastmaster at the banquet. Films on water and rail transportation were included in the program.

Report on Columbia Basin to Be Made at December Session

The report on the feasibility of the proposed Columbia River Basin irrigation project in the State of Washington will not be submitted to Congress until the December session, it was announced at the Interior Department on May 8.

Delay in the findings of the commission investigating this project, of which Francis M. Goodwin, Assistant Secretary of the Interior, is chairman, is due to the necessity of revising and reviewing the engineering, agricultural, and economic data so that they will conform to the recommendations contained in the recent report of the special advisory committee on reclamation.

Chairman Goodwin also stated that additional field surveys will be made on several areas in the Columbia River Basin in order to supply more complete data as to certain features of the project. These surveys, he said, would be conducted during the coming summer.

It was originally planned by the commission appointed last year by the Secretary of the Interior to submit the report to Congress at the present session. The other members of the Columbia River Basin commission are Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, and W. E. Weymouth, chief engineer of the Bureau of Reclamation.

New Electrical Code Discussed at Boulder Meeting

The new National Electrical Code and its relation to better wiring were stressed at a meeting of the electrical men in Boulder, Colo., April 25. Contractors, wiremen, city officials including the fire chief and building inspector, and representatives of the Public Service Company of Colorado attended the meeting.

The gathering was sponsored by F. S. Henderson, local manager of the central station company, who is a member of the wiring committee of the Rocky Mountain division of the National Electric Light Association. In such capacity he arranged for L. A. Barley, chief engineer of the Mountain States Inspection Bureau, and S. W. Bishop, chairman of the division wiring committee, to address the gathering.

Included in the recommendations for better wiring were the minimum standards of outlet connections recently issued by the national wiring committee. Similar meetings will be held in other Colorado cities during the summer.

COMING EVENTS

National Electric Light Association—
Annual Meeting—Atlantic City, N. J.
May 19-23, 1924

The Electric Power Club—
Absecon, N. J.
May 26-29, 1924

American Association of Engineers—
San Francisco, Calif.
June 11-13, 1924

Pacific Coast Electrical Supply Jobbers' Association—
Quarterly Meeting—Coronado, Calif.
June 12-14, 1924

Pacific Coast Electrical Association—
Annual Meeting—Coronado, Calif.
June 16-20, 1924

Wyoming Public Utilities Association—
Annual Convention—Casper, Wyo.
June 23-24, 1924

Northwest Electric Light and Power Association
Annual Convention—Gearhart, Ore.
June 25-27, 1924

Seattle Electric Home Exhibit to Be Held in Fall.—The dates for Seattle's proposed annual electrical home demonstration and electrical campaign to be conducted by the Electric Club, have been set for Aug. 16 to Sept. 2, inclusive. A. J. Lutz, of the Pacific States Electric Company, has been named general chairman of all committees. Mr. Lutz will be assisted by Harry Byrne of the North Coast Electric Company, who has been named vice-chairman. Other committees will be named by Harry J. Martin, president of the Electric Club, when complete plans for the home and campaign have been formulated.

National Lighting Campaign to Be Aided by Denver Men

Plans for participation in the national lighting educational campaign are being made by the Electrical Cooperative League of Denver, Colo., although details of the campaign will not be announced until the National Electric Light Association convention is held at Atlantic City, May 19-23.

On receipt of the initial information concerning the contemplated campaign from J. E. Davidson, vice-president of the National Electric Light Association and chairman of the special committee, the advisory board of the Denver league commenced the foundation for later activity both in Denver and the mountain region.

Orders were placed with the Society for Electrical Development for copies of the monograph, "Building Residence Lighting Business" and these are now being distributed to every member interested in lighting in any manner. According to S. W. Bishop, executive manager of the league, this action will pave the way for a better personal understanding of the underlying features of the campaign by individual members when it is actually launched.

To tie in with the national activity, it is understood that the league, in the program for its new fiscal year starting July 1, contemplates another electric home, a model store lighting exhibit, and further emphasis on its educational work with architects and builders. A special committee consisting of F. F. McCammon, A. C. Cornell, H. D. Randall, and D. D. Sturgeon are busy at the present time outlining the plans.

Southern Colorado Power Company Representatives Meet.—A conference of local managers of branches of the Southern Colorado Power Company in eight towns east and west of Pueblo, Colo., was held April 21 and 22 in Pueblo when matters pertaining to the business of the company were discussed. Twenty-five out-of-town representatives of the company attended. The meeting was presided over by W. F. Raber, vice-president and general manager of the company. After the business sessions, the visitors were given an entertainment program including a tour of the company's property in Pueblo, theaters and automobile tours of the city, a bowling tournament, and a dance. Representatives from Canon City, Florence, Cripple Creek, Victor, Rocky Ford, La Junta and Ordway were present.

Street Lighting Subject of San Diego Electric Club Address.—Recalling to memory the changes in methods of street lighting in San Diego during the past 30 years, Bert Johnstone, city electrician, as chairman of the street lighting committee, gave the San Diego Electric Club a brief history of city street illumination at the April 29 meeting of that club. Figures on comparative lighting for the city were given by Mr. Johnstone. On April 21, 1923, there were installed and ordered for San Diego 611 ornamental standards and 1,063 overhead street lights. On April 21, 1924, there were 1,021 ornamentals installed or ordered, a 70 per cent increase, and 1,110 overheads, an increase of but 4½ per cent, showing a tendency toward more of the ornamental street standards.

Manufacturer, Dealer and Jobber Activities

The Globe Electric Supply Company of Denver, Colo., has been appointed distributor of the Eden Electric Washing Machine Company in the Rocky Mountain region, as the result of arrangements made recently by Fred Hazard, sales manager of the latter company. According to Paul Douden, manager of the Globe company, warehouse stocks are also being maintained by his company for the Illinois Wire & Cable Company, Sycamore, Ill.

J. Ludwig Hansen, representing the Pacific Electric Manufacturing Company, Inc., in Denver, Colo., has moved his offices from 215 Ideal Building to 409 Symes Building. Other accounts handled by his firm are Pittsburgh Transformer Company, Continental Electric Company, Industrial Products Company, and Electric Fuseguard Company.

Crouse-Hinds Company, Syracuse, N. Y., has distributed Folder No. 10, which is entitled "New Ideas in Electric Hand Lanterns." The folder contains description of the type VSB vaporproof lantern for use wherever combustible vapor, gas, or dust is present. This lantern is designed for use with any lamp up to and including 75-watt size. A description of the type LM inspection lantern is also contained in the folder. This lantern is designed for use in railway coach yards, roundhouses and shops, freight transfer terminals, garages or other places where a strong, protected lantern is needed. A wire glass front is held against a gasket by a spring wire retaining ring in order to protect the lamp.

The Electric Contracting Company, one of the youngest contracting firms in Denver, Colo., has moved to a new location at 408 E. 20th Avenue, close to the business district.

Roller-Smith Company, New York, N. Y., has published Bulletin No. 10, April, 1924, which is a revision of the same bulletin dated July, 1923. The bulletin is devoted to Roller-Smith small size instruments for radio control panels. In the bulletin there appears a description of the new Roller-Smith type TD radio voltmeter, double range, 0-6 and 0-120 volts, which is intended for mounting on radio sets for the purpose of reading "A" and "B" battery voltage. The manufacturer claims that the particular feature distinguishing the voltmeter from ordinary double range voltmeters is that it incorporates a self-contained switch for the purpose of connecting the 6-volt range to the "A" battery or the 120-volt range to the "B" battery.

The Western Electric Company, New York, N. Y., has recently announced the offering of a complete new line of seven Davis flood lighting projectors. It is claimed that while this line is limited to but seven different types, the range covered is sufficient to meet practically all requirements in the flood-lighting field. The Davis line includes a new searchlight, beamlights and floodlights, and there is a small lighter weight unit for general utility purposes.

Curtis Lighting, Inc., Chicago, Ill., has recently inaugurated a direct-by-mail cooperative campaign with jobbers and dealers called "The Big Idea." The campaign is designed to help jobbers and dealers sell more X-Ray reflectors, wire, conduit, fittings, lamps, etc. Included in the material are a series of letters designed to be sent to jobbers' salesmen, dealers, and lastly "dealer to consumer" material.

Nollenberger & Dorner, Denver, Colo., contractors and dealers, have formed a baseball club to represent them in one of the fast semi-pro leagues recently organized in that city. The only other electrical team in the city is the championship Public Service Company nine which, because of its speed, is unable to schedule games with opponents of comparative caliber.

The Esterline-Angus Company, Indianapolis, Ind., has published Bulletin 424, which is devoted to showing some of the installations of the company's graphic instruments in sixteen of the twenty plants of the General Motors Corporation. Several interesting installations are shown in the bulletin.

Three of the wily golfers who defied the winds in the golf tournament at the Stockton meeting of the California State Association of Electrical Contractors and Dealers. Charlie Musladin, of Alexander & Lavenson Electrical Supply Company, helped Harry Woodward, of the Great Western Power Company, and winner of the cup, to bear up under the strenuous congratulations of Art Fierce of the Wholesale Electric Company.

The Hirschy Company of Duluth, Minn., has entered the washing machine field in Denver, Colo., with the establishment of a factory branch at 812 15th Street, which branch will be known as the Denver Zenith Washer Company.

Jewell Electrical Instrument Company, Chicago, Ill., has published the first issue of what is to be known as "The Jewell Magnet." The new house organ contains interesting matter concerning the activities of company men as well as information concerning the use of Jewell electrical instruments. According to the editor's announcement, the publication will be sent to friends of the company.

Norman Hicox, sales manager of Curtis Lighting, Inc., Chicago, Ill., announced in Denver, Colo., on his return from the Pacific Coast that his company, manufacturers of X-Ray reflectors, had perfected a new reflector to overcome daylight reflections in display windows that would prove a revelation to the electrical industry. He advised that no details would be given out by his company until shipments were started in the early summer.

The Bakelite Corporation, New York, N. Y., has had prepared a two-reel motion picture showing the method of manufacturing Bakelite. The film shows how the two basic materials, carbolic acid and formaldehyde, are obtained, as well as how these two substances are mixed to obtain the final product. The picture also shows a number of the uses of the new material in every-day life. The Bakelite Corporation has announced that it will loan the picture free to churches, schools and other centers of non-theatrical exhibition.

The Wm. J. Foley Company, 230 Fifteenth Street, Denver, Colo., distributors of house heating equipment, have added a line of electrical appliances. Among the accounts represented are the Coffield Washer, Ohio Tuec Cleaner, Grand Ironer, and the Minneapolis Heat Regulator. A retail branch has been established by the company in the Home Public Market.

Allen-Bradley Company, Milwaukee, Wis., has recently published four bulletins on its line of a.c. motor starters. The bulletins are well illustrated and contain descriptions of the various types of starters as well as illustrations of typical installations. The four bulletins that have just been published are as follows: Bulletin No. 600, "Allen-Bradley Alternating Current Resistance Starters"; Bulletin No. 640, "Allen-Bradley Type H-1852 Semi-Automatic Resistance Starter"; Bulletin No. 720, "Allen-Bradley Type J-1552 Across-the-Line Starting Switch"; Bulletin No. 740, "Allen-Bradley Type J-3052 Automatic Resistance Starter."

The General Electric Company has recently published sheet No. 66021, which describes the General Electric single watthour meter indoor current transformer. The transformer is designed for circuits up to 4,500-volt, 25-60 cycles, and is known as type L-3. The mechanical features of the transformer are fixed secondary terminals, mounting base arranged for either pipe or wall mounting, and uniform dimensions for all sizes between primary bolt holes and in height of primary terminals from mounting base. Uniform dimensions of all sizes permit the substitution of a transformer of one capacity for one of another capacity without the necessity of altering the primary wiring. The polarity is indicated by white markings on the primary and secondary terminals. Both dimensions and ratings of the L-3 current transformer are presented on the descriptive sheet.

Max Rosenthal of Williams & Rose Electric Company, Denver, Colo., has purchased the stock and selling rights of the X-Cel-All Master-Lite Company of Colorado from Lawrence & Griffing. Mr. Rosenthal expects to establish a separate department in his old business for handling this line of commercial lighting units.

Personals

Herbert J. Flagg, for four and a half years chief engineer of the State Department of Public Works at Olympia, Wash., has resigned to become assistant manager of the Grays Harbor Railway & Light Company in Aberdeen, Wash., taking up his new duties on May 1. Mr. Flagg is a graduate of the University of Washington School of Engineering, and following graduation in 1912, entered private practice at McMinnville, Ore., where he became assistant city engineer. He was also city engineer for the towns of Dallas and Hillsboro.

HERBERT J. FLAGG

He entered the service of the state in 1915 as assistant engineer under T. E. Phillips. During the war he served as captain of the Coast Artillery, and was later transferred to Fort Monroe, as instructor in Coast Artillery School. Mr. Flagg will have charge of the extensive improvements which will be made by the Grays Harbor Railway & Light Company, involving the expenditure of more than $500,000 in improving the power plants of the Grays Harbor district.

J. L. Phillips, formerly connected with the Atlanta, Ga., office of the Okonite Company, has been appointed Pacific Coast manager for the company, with headquarters in San Francisco. The Okonite Company's district offices are at present in the Call Building, but on and after June 1 they expect to be located at 754 Monadnock Building, San Francisco.

Martha E. Dressler, instructor in the home economics department at the University of Washington, Seattle, Wash., was recently the honor guest and principal speaker before The Electric Club of Seattle.

Glen E. Arbogast, president of the Newbery Electric Corporation, Los Angeles, Calif., has been elected first vice-president of the newly organized California State Builders' Association. It is estimated that the members of this organization control an expenditure of more than $365,000,000 in building construction per year.

Oliver T. Erickson, former city councilman of Seattle, Wash., and author of the Erickson superpower bill, and **Norwood Brockett** of the Puget Sound Power & Light Company, also of Seattle, recently participated in a debate on the power question at a special meeting of the Seattle Credit Men. The former presented the municipal ownership side, and the latter that of the public utilities. Each speaker was allotted thirty minutes to discuss the question.

Z. E. Merrill of Albany, Ore., assistant general manager of the Mountain States Power Company, and **A. L. Martin**, Marshfield manager for the same company, were recently in Bandon where they met with the city council in regard to supplying the city with electric service. The city has already received bids on a standby plant of about 200 hp. The power company proposes, instead, the building of a transmission line into Bandon from Beaver Hill. Action will be deferred until a more careful consideration of the two propositions can be made.

J. G. Keegan, local manager of the Cheyenne Light & Power Company, Cheyenne, Wyo., a subsidiary of the Public Service Company of Colorado, is one of the principal directors of the 28th Annual Frontier Days celebration in that city. The show will be staged July 22-25 and Mr. Keegan will have charge of the Indians, decorations, and music.

Ely C. Hutchinson, vice-president and general manager of the Pelton Water Wheel Company, San Francisco, Calif., is spending a month at Philadelphia, Pa., and New York City on business for his company.

G. H. Froebel, manager of the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa., was a recent Seattle, Wash., visitor.

U. G. Jackson, ex-city engineer of Kelso, Wash., has been engaged by the American By-Products Company to make ground surveys of the company's site of 1,000 acres of land near Kelso. It is proposed to establish a large factory employing several hundred people.

C. H. Pendleton, who has been connected with the sales department of the Pacific States Electric Company of Los Angeles, Calif., for a number of years, has just recently joined the California Street Lighting Sales Company as sales manager.

Robert ("Bob") Edwards, of Edwards & Company, Inc., New York City, is visiting the Pacific Coast in the interests of his firm. Mr. Edwards has already spent some time in Los Angeles and San Francisco, Calif., and has left for the Northwest.

A. C. Cornell, manager of the Western Electric Company; **John J. Cooper**, manager of the Mountain Electric Company; **Guy B. Hopkins**, auditor of the Public Service Company of Colorado; **George E. Lewis**, executive manager of the Rocky Mountain Committee on Public Utility Information, and **S. W. Bishop**, manager of the Electrical Cooperative League, are among the Denver, Colo., electrical men who will attend the convention of the National Electric Light Association at Atlantic City, N. J., May 19-23.

George Boring, of the Pacific States Electric Company, Portland, Ore., was a recent visitor to San Francisco, Calif., on business for his company.

C. S. Peterson, illuminating engineer of the Treasury Department, while inspecting the federal buildings in Denver, Colo., recently, addressed the commercial department representatives of the Public Service Company of Colorado.

R. G. Gentry, commercial manager, **G. W. Faller**, assistant vice-president, **H. H. Kerr**, electrical superintendent, **M. McK. Koch**, electrical engineer, **Carl Luscombe** and **L. W. Cody**, of the Public Service Company of Colorado, Denver, Colo.; **Fred Norcross** of the Home Gas & Electric Company, Greeley, Colo., and **E. A. Phinney** of the Jefferson County Power & Light Company, Golden, Colo., will attend the National Electric Light Association convention at Atlantic City, N. J.

George W. Bixler, director of publicity and public relations for the Public Service Company of Colorado in Denver, Colo., will serve as a delegate from the advertising bureau of the Denver Chamber of Commerce at the international convention of the Advertising Clubs of the World to be held in London, England, in July.

A. M. Frost, manager of the commercial department of the San Joaquin Light & Power Corporation, has left for Atlantic City, N. J., to attend the annual convention of the National Electric Light Association.

H. E. Sandoval, manager of electric sales of the Pacific Gas and Electric Company, San Francisco, Calif., has left for Atlantic City, N. J., to attend the annual convention of the National Electric Light Association.

H. H. Allison, for some time illumination sales engineer of the Pacific Gas and Electric Company, San Francisco, Calif., has resigned from that company to become associated with the National Lamp Works of the General Electric Company, Oakland, Calif.

S. E. Gates, Spokane, Wash., manager of the General Electric Company, has been appointed manager of the Los Angeles, Calif., office and left for that

S. E. GATES

place on May 5. Mr. Gates has been in charge at Spokane for fourteen years and has been very active in civic affairs —particularly in the activities of the Spokane Chamber of Commerce. During the year 1923 Mr. Gates was chairman of the Industrial Bureau and carried through a very successful program of activities.

W. E. Ahrens, Seattle, Wash., has been appointed division plant engineer of the Pacific Telephone & Telegraph Company for the State of Washington, succeeding **R. Z. Young,** who goes to San Francisco to assume a new post with the company. Mr. Ahrens has been outside plant engineer, with supervision over all the outside construction and maintenance work of the company in the state. He came to Seattle in 1908, and has been with the company since that time in the engineering department. He will be succeeded by **O. E. Mong,** who has been transmission engineer for the company since 1910. **F. D. Carroll** succeeds Mr. Mong as transmission engineer.

Albert Slocum Terry, supervisor of the lamp laboratories of the General Electric Company, was a visitor to San Diego, Calif., recently, spending his vacation in that locality.

J. M. Hooper, of the Rainier Electric Company, and secretary of the Electric Club of Seattle, on May 2 was elected president of the Fraternal Order of Eagles, Aerie No. 1, and after June 2 will be the active head of the largest Aerie in the United States.

Charles A. Semrad, assistant general manager of the Public Service Company of Colorado with headquarters at Boulder, Colo., has been elected president of the Rotary Club of that city for the coming year.

Ray W. Turnbull. Northwestern representative of the Edison Electric Appliance Company, Chicago, Ill., has been made assistant Pacific Coast sales manager of that company. Mr. Turnbull was born and raised in New Haven, Conn., and entered the electrical business in Pasadena, Calif., in the employ of the Southern California Edison Company. Some time later he joined the staff of the Pacific Electric Heating Company (predecessor of Edison Electric Appliance Company) at Ontario, Calif. Early in 1911 he became affiliated with the General Electric Company as electric heating specialist working out of the San Francisco office. Shortly after this he was transferred to the Portland, Ore., office in the same capacity and remained on that work until the outbreak of the war. In 1917 he entered the army and earned a commission in the aviation corps. After the war Mr. Turnbull joined the staff of the Edison Electric Appliance Company, having direct supervision over the Northwest.

RAY W. TURNBULL

R. B. Williamson, electrical engineer in charge of alternating current design of Allis-Chalmers Manufacturing Company, sailed April 26 for a two months' trip to the British Isles and the Continent. During his trip Mr. Williamson will inspect European engineering developments and will attend the British Empire Exposition at Wombly.

W. C. Sears, sales manager, electrical department, Western division, of Landers, Frary & Clark, New Britain, Conn., is making a tour of the Pacific Coast. He has already visited Los Angeles and San Francisco, Calif., and will take in the cities of the Northwest before returning to the factory.

Frank N. Cooley, former sales manager of the Western Electric Company in Seattle, and now manager for that firm in Duluth, Minn., has organized a club of electrical dealers and contractors in that city, of which he has been elected president.

T. E. Bibbins, president of the Pacific States Electric Company, San Francisco, Calif., has been elected a director of the newly organized Pacific National Bank in that city.

A. E. Tregenza, formerly sales manager of Economy Fuse Manufacturing Company, Chicago, Ill., has recently gone with the Chicago Fuse & Manufacturing Company, also of Chicago, as assistant to the president, in charge of commercial relations.

G. H. Froebel, manager marine department, and **W. E. Phau,** general engineer, of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., are spending several weeks in Los Angeles, Calif., territory in the interests of their company.

Norman B. Hickox, sales manager of Curtis Lighting, Inc., Chicago, Ill., recently spent several weeks in Los Angeles and southern California in the interest of his company.

W. W. Weir, designing engineer of the Majestic Electric Development Company of San Francisco, Calif., recently spent two weeks in Los Angeles and southern California, looking after installations and new business in the interests of his company.

H. A. Cordes, formerly with the Southern California Edison Company in the Big Creek division, has recently joined the General Electric Company in their Los Angeles, Calif., office. Mr. Cordes graduated from the University of Southern California in 1919 and then went to Schenectady, New York, where he took the apprentice course of the General Electric Company at their factory. After the completion of his course he returned to California in 1921, and went to work for the Southern California Edison Company.

L. M. Watson, central station division, Westinghouse Electric & Manufacturing Company, Los Angeles, Calif., is on a trip to the factory of that company at Pittsburgh, Pa. While East he will visit the New York and Philadelphia offices of the company.

L. A. S. Wood, director of the Illuminating Engineering Society, and inventor of a new system for distributing light in equal proportion to all parts of the street, conserving light now wasted and eliminating glare, spent several days in Salt Lake City, Utah, and Ogden recently, demonstrating his improved lighting arrangement.

Obituary

Colonel H. M. Byllesby, president of the Byllesby Engineering and Management Corporation—parent organization of the Western States Gas & Electric Company, the San Diego Consolidated Gas & Electric Company, the Coast Valleys Gas & Electric Company, the Northern States Power Company, and of other utility companies—died suddenly on May 1. Colonel Byllesby had a spectacular career from the time he left Lehigh University and was one of the foremost figures in the utility field. His early experience included employment by Thomas A. Edison, with whom he maintained a close association throughout his entire activity. In 1885 Colonel Byllesby was made a vice-president of the newly formed Westinghouse Electric Company and in 1889, at the age of thirty, he was sent to Europe to represent Westinghouse interests. During the early 90's he was head of a large electrical supply house with headquarters at St. Paul, Minn. Later activities included central station construction and management in Oregon, Montana, California and other states. During the war he served in the Signal Corps and, later, as chief purchasing agent for the A. E. F. in Great Britain and Scandinavian countries. For this and other meritorious services he was awarded the Distinguished Service Medal. Despite the many great honors bestowed upon him Colonel Byllesby was extremely democratic in his personality and was unusually popular among his employees.

COLONEL H. M. BYLLESBY

Tully Scott, former chief justice of the Colorado Supreme Court and more recently a member of the Public Utilities Commission of that state, died in Denver, Colo., May 4, after an intermittent illness of several years' duration. Mr. Scott was well known to the utility and electrical men of the mountain region and especially in Colorado where his decisions were always regarded as fair and impartial.

J. W. Lawson, one of the charter members of the Edison Pioneers, an organization of men who worked with Mr. Edison in the early experimental days at Menlo Park, N. J., died in San Diego, Calif., April 29.

Trade Outlook

San Francisco

In San Francisco and the territory tributary to it business conditions are fair, although there is apparently a tendency toward lessened activity. This is believed to be due in part to the effects of the hoof and mouth disease quarantine and the consequent embargo on shipments of fruits, vegetables and other products, with resultant reduction in prices. However, conditions in this connection are expected to improve materially, as the ban on many sections has already been lifted, and the removal is continuing as rapidly as quarantined sections are reported free from infection.

Agricultural conditions throughout the state also naturally affect San Francisco business. In several sections the drought has been severe, and the crop outlook, particularly that of hay, is not promising. This, of course, is reflected in retarded buying, and wholesalers of shoes and men's furnishings report little movement.

There is continued activity in building, with marked increase in the number of homes being constructed in outlying residential districts, and a steady erection of modern apartment houses.

Money is plentiful, with rediscount rates quoted around 4 per cent. Collections are reported fair. Labor seems to be well employed at good wages, but some unemployment is noted among the unskilled class.

Los Angeles

There has been a general change for the better in the electrical business both in retail and wholesale lines, retail business having picked up just prior to Easter, and sales are most favorable for this period of the year. There is a decided optimistic outlook from the wholesalers, who, while not getting all the business that they had anticipated for this year, are enjoying a profitable business.

This fact is borne out by the building permits which reveal about an even break with the same period a year ago, the number of permits issued for the period April 15 to 30, 1924, being 2,084 with a valuation of $7,306,585 as compared with 2,650 permits having a valuation of $7,901,512, for the corresponding period of last year. Radio sales have shown a decided improvement in the past month and bid fair to continue.

The foot and mouth epidemic which has caused serious losses in Los Angeles and throughout California is under control and this has resulted in a lifting of the quarantine restrictions so that salesmen are able to travel about freely, which helps considerably. The rains of last month came at an opportune time and, on the whole, there is a decided undertone of conservative optimism.

Portland

Business in Portland and vicinity is in a prosperous condition. April figures now available show that bank clearings, building permits and lumber exports all showed gain over March, 1924, and April of last year.

Building continues at a good rate. Construction of a 12-story building to cost $1,000,000 was recently announced by A. M. Bedell of New York. Homes and residence building lots are much in demand and "for rent" signs scarce.

Portland's lumber business has experienced a temporary setback. Production remains about 10 to 12 per cent above normal. There has during the last few weeks been a further slackening of orders and shipments. In spite of all this, actual shipments of lumber during April were slightly heavier than April, 1923.

The most disturbing elements in the business life of Portland at present are the effects of the epidemic and drought in California. Portland and Oregon are dependent on California for many staple articles and the quarantine has seriously affected shipments.

Collections are not improving and there is some idle labor because of slowing up of the lumber business.

Salt Lake City

While the "between-seasons" quietness is apparent in some lines of business, there is a generally healthy tone. Building activity maintains a steady increase.

In the agricultural districts it is expected sugar beets will bring good returns this year and that pea raisers and tomato growers will do well. The wool men are prosperous, and the cattlemen are getting into a better position. Three years ago the canners were in distress; present conditions would seem to indicate that this year they will be on a more substantial basis than has been the case up to this time.

Wage increases of 25 cents per day have been announced by the Utah Copper Company at its Bingham mines and its mills at Magna and Arthur. Similar increases have been announced at the plants of the International Smelting Company, the United States Smelting, Refining & Mining Company, and the American Smelting & Refining Company.

Denver

Out of a total of 65,000 habitations, there are but 1,207 vacant houses and apartments in this city, according to the books of the Public Service Company of Colorado. This is less than two per cent and constitutes the best record since world war times, leading realtors state. It is considered one of the basic factors responsible for the continuing building boom as shown by the comparative figures for 1923.

Building permits for the first four months of the present year exceeded the same period a year ago by about $1,017,700 and the total for April amounted to approximately $2,416,650. House and apartment house construction is primarily responsible for the major part of the building program.

Retail purchasing has not picked up to the extent anticipated early in the year. In electrical lines, however, a fair volume of appliances is moving. Those electric shops handling radio equipment are leading the field in sales of appliances. An early start is being given to the campaign on electric fans this year as local dealers look for a good volume of sales, judging from early season inquiries.

Considering all basic factors, business in Denver is regarded as good notwithstanding the pessimistic aspect held in some lines.

Spokane

The abnormally early spring has had the usual consequences of late frosts and little rain. The apple crop at Walla Walla has been damaged severely by heavy frosts, and the prune crop also to some extent. In the Lewiston district it is estimated that cherries have been damaged twenty per cent by frost. Throughout the Inland Empire rain is needed; with rain during the next two months a bumper wheat crop should be obtained. Already ten per cent of the winter wheat at Ritzville has been reseeded. The irrigation districts in Spokane Valley are beginning to use their pumps, although facing at the same time the possibility of further frosts.

Another rich silver strike near Bayview, Idaho, and a new rich seam of copper, silver and lead near Colville, Wash., are reported.

In general, the territory may suffer some reverses this year due to crop failures, but in other respects the prospects are so bright that sustained optimism is justified. All the manufacturing plants of Spokane, with but few exceptions, are working at good output. Retail, wholesale, and jobbing lines report business conditions on the whole as being better than a year ago.

Seattle

General business conditions in the Puget Sound territory are reported satisfactory, with prospects for the summer trade bright. A slight decline in some lines of retail trade is noted, but this is not expected to continue, and volume of business is holding up well.

Lumber conditions are uncertain, with further shutdowns in lumber manufacturing plants predicted in some quarters. Commercial logging operations have been reduced, and some price cuts have been announced. About half of the new business taken during the past week or ten days was for water delivery, although new business for rail shipment is increasing.

Construction work is continuing in good volume, especially in residence work, with a large volume of small building under way. Real estate operators report a continued tendency of buyers toward better homes, particularly as regards electrical equipment. Some dealers report that it is difficult to sell a new home that has not been wired for electric equipment, particularly for range.

Household equipment has received decided impetus during the past three months, and dealers believe that this will be an unusually good year for ranges, washers, vacuum cleaners and smaller electrical devices.